

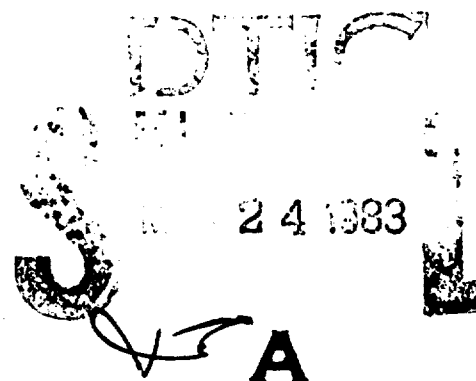
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**CHEMICAL WEAPONS REARMAMENT AND
THE SECURITY OF EUROPE:
CAN SUPPORT BE MUSTERED?**



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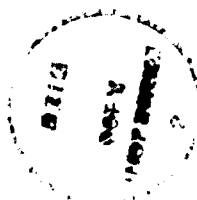
**CHEMICAL WEAPONS REARMAMENT AND
THE SECURITY OF EUROPE:
CAN SUPPORT BE MUSTERED?**

by

**John M. Weinstein
and
Henry G. Gole**

20 January 1983

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Composition of this memorandum was accomplished by Mrs. Janet C. Smith.

FOREWORD

This memorandum considers the current debate addressing the issue of US/NATO chemical weapons modernization and rearmament. The authors examine the arguments of those who support and oppose major new US chemical warfare initiatives such as the production of binary munitions. They conclude that the Soviet CW arsenal is substantial and discuss the flexibility and roles of chemical munitions in several likely circumstances. However, the authors maintain that a CW environment poses numerous risks and uncertainties to Soviet planners and that NATO's position is not so impotent as many believe. Citing the critical importance of the European allies' sensitivities on the CW issue, the authors recommend continued improvement in NATO's defensive CW stance, a low-key upgrading of the US chemical arsenal followed by the *replacement* of older munitions deployed in Europe, and a shift in the emphasis of current means of delivery. ←

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Major General, USA
Commandant

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SUMMARY

Among the most vexing policy issues confronting American and Western European military planners today concerns the scope and direction of the West's chemical warfare doctrine and capability.

In general, analysts advocating chemical weapons rearmament argue that (1) the Soviet/Warsaw Pact CW capability is much larger, more effective, and at a higher state of readiness than its US/NATO counterpart and far greater than that required for deterrence; (2) most of the factors that traditionally have discouraged the use of chemical weapons are absent from Soviet considerations; (3) the potency and flexibility of the Soviet CW arsenal would give decided advantages to the Warsaw Pact in both conventional and tactical nuclear war with NATO; (4) the essentially passive CW defensive posture of NATO is neither sufficient for the protection of our troops nor does it constitute an adequate deterrent; and (5) the rather modest price tag associated with chemical modernization and enhanced preparedness relative to the improvement in deterrence and the protection they will provide to NATO troops if deterrence fails make improved CW capabilities cost-effective and prudent.

The case against a new, major US initiative in CW rearmament and modernization focuses on six policy considerations: (1) the lack of unambiguous evidence regarding the quantities of chemical agents the Soviets produce, where they store them, and where they are deployed; we cannot be sure whether the primary Soviet CW effort is offensive or defensive; (2) while the politically significant aversion to CW in Western democracies, often underestimated by Western CW proponents, has no visible counterpart in the Soviet Union, practical operational and political inhibitions to Soviet CW use against NATO do exist; (3) the West has enough chemical munitions, and NATO defensive measures—combined with maintaining existing stocks and non-CW military capabilities—are sufficient to deter Soviet CW use; (4) even if used first by the Warsaw Pact, a large-scale NATO response in kind would have only marginal military effects; (5) assets planned for the binary weapons program would be better invested in other Western military systems; and (6) political costs of a strained NATO alliance outweigh the military advantages of a vigorous US chemical weapons modernization effort.

There is merit in the arguments of both sides. The evidence discussed in this essay leads one to the following conclusions:

- The Soviets and the Warsaw Pact have a potent CW force, although precise estimates of the nature and extent of the threat are unattainable;

- In spite of Soviet CW strength, uncertainties (due to weather, terrain, etc.) attending the use of chemical agents, as well as the scope and severity of a NATO response, make an assured victory far from certain for the Soviets and may, therefore, deter their employment of chemical agents more than is commonly acknowledged;

- The size and potential lethality of the US/NATO chemical arsenal may be understated. The West's chemical arsenal is probably adequate to deter the Soviet use of chemical weapons in any limited conflict scenario, Soviet chemical munition quantitative advantages notwithstanding;

- In an all-out offensive employing nuclear and chemical munitions, it is unclear that the West would accrue any significant advantages by pursuing a massive chemical munitions buildup.

The policymaker is confronted with the difficult task of reconciling conflicting claims to truth and wisdom and devising a policy that is militarily prudent yet mindful of the political exigencies inherent in a multilateral alliance such as NATO. In light of these policy objectives, the following considerations and recommendations are offered:

- The time is not propitious to initiate a new CW program with the European allies. The political sensitivity of the CW issue is likely to derail European support for the dual-track INF decision in particular and Western NATO solidarity and deterrence in general.

- The Reagan Administration's goal of improving NATO's defensive CW posture will reduce the efficiency of any Warsaw Pact use of chemical munitions. This defensive posture is laudatory and crucial.

- In order to (1) address the concerns of our European allies regarding the safety factor of forward-deployed military CW munitions, (2) improve the readiness and effectiveness of the West's chemical deterrent, and (3) encourage the Soviets to consider the reduction of their CW arsenal, a modest and low-key binary upgrading of the US chemical arsenal is in order.

• However, the new munitions should *replace rather than augment* existing forward-deployed unitary munitions. Furthermore, current emphasis upon short-range delivery means should be reappraised. A partial switch to long-range systems offers several important political and military advantages to NATO.

CHEMICAL WEAPONS REARMAMENT AND THE SECURITY OF EUROPE: CAN SUPPORT BE MUSTERED?

Among the most vexing policy issues confronting American and Western European military planners today concerns the scope and direction of the West's chemical warfare doctrine and capability. This issue has arisen in response to a number of developments on the military and political scenes, both at home and abroad.

The continuing expansion of the Soviet Union's strategic and theater arsenals has stimulated considerable debate regarding the balance of conventional and tactical nuclear forces in Europe. In the past, NATO's strategy to deter Soviet/Warsaw Pact aggression relied upon the former's tactical and theater nuclear superiority to counterbalance the latter's conventional might. If NATO's nuclear edge has disappeared, as is argued by numerous military and civilian analysts,¹ this development is disturbing indeed. The alleged erosion of NATO's military capabilities *vis-a-vis* those of the Soviet Union and the Warsaw Pact raises critical questions for military planners and politicians on both sides of the Atlantic. Foremost among these questions are "how much is enough?" and "what intentions underlie the Soviets' force developments?" As one might expect from an alliance composed of members from

different hemispheres and different historical experiences, the NATO response has not been unanimous. Generally, the United States, especially under the current administration, has urged a rapid military buildup to deter the Soviet Union and to signal US renewed determination to conduct East-West relations from a position of strength. On the other hand, many Europeans continue to eschew military emphasis as the primary policy tool.² They have emphasized the role of interlocking and mutually beneficial political and economic relations between East and West to obviate the need for the extensive military buildup urged so forcibly by Washington.

The divergence between European and American perceptions of the nature of the threat, as well as the most expedient and efficacious response, has been demonstrated repeatedly and spectacularly in the intra-alliance debates on the need for such weapons and systems as the enhanced radiation warhead (neutron bomb), ground-launched cruise missile, the Pershing II intermediate range ballistic missile, and a no-first-use of nuclear weapons policy.

Additional strains upon the increasingly fragile Atlantic alliance³ arise from uncertainty about the course of the Soviet Union in the post-Brezhnev period. It remains to be seen whether the myriad economic, social, and demographic problems which are currently tearing at the fabric of the last of the great international empires will turn the Soviet Union inward toward a less threatening orientation or cause it to resolve its internal contradictions through aggression. Related to this uncertainty is the question of where such aggressive behavior would be directed if it did in fact occur. Would it be directed against Western Europe, especially if NATO had been emasculated by internal dissention, inertia in its force development programs, or a no-first-use nuclear weapons policy? Or might the Soviets decide to employ their expanding abilities to project their force and strike at vital US interests in the Third World? Since few military planners believe that the United States can achieve the global omnipresence and unquestioned economic and military ascendancy enjoyed in the fifties and sixties, the anticipation of the timing and direction of the Soviet threat is a matter of some moment. It will play a large role in determining whether the United States opts for a new maritime/rapid deployment strategy or continues to emphasize the continental strategy upon which we have relied in the postwar period.⁴

It is within this complex web of issues that US and NATO chemical warfare (CW) capabilities and strategies must be evaluated. The chemical warfare issue, important in its own right, takes on broader significance because it affects the overall military doctrine and posture of the United States, our relations with the Soviet Union, the essence of deterrence, and the very fabric of the NATO alliance. Because of the importance of the chemical warfare issue, it is not surprising that discussions of CW have taken on the quality of a religious debate in which convictions rather than evidence often dominate discourse.

The United States currently is considering the future of our chemical warfare arsenal. Proponents of expanded US/NATO chemical capabilities cite the growing imbalance of NATO-Warsaw Pact (WP) military capabilities in general and CW capabilities in particular. Noting that Soviet and Pact CW capabilities are greatly in excess of those needed for defense or retaliation against NATO's allegedly small and rapidly diminishing stocks,⁵ they counsel a rapid improvement of our offensive and defensive CW capabilities as a prudent and necessary means of deterring the Soviets from using chemical weapons against us. Should deterrence fail, they argue, NATO should be able to respond in kind to Soviet use of chemical weapons as a deterrent to continued Soviet use and as a means of avoiding the no-win choice between surrender and resort to nuclear weapons.⁶

Numerous military and civilian analysts take quite a different view of the CW issue. In general, these CW opponents make one or more of the following arguments: assessments of the Soviet chemical threat rely on questionable data about Soviet CW offensive capabilities and tenuous interpretations of Soviet intentions; given the alliance's defensive posture, NATO's CW arsenal is large enough to deter the Soviets from resorting to their CW capabilities; CW modernization and expansion will deflect monies and interests away from more urgently needed improvements for our conventional and theater nuclear arsenals; and an American initiative for an enhanced CW capability may push an already fragile NATO beyond its breaking point or sour the Europeans to the extent that other more necessary yet controversial programs, such as the deployment of the long-range theater nuclear forces, are not implemented.⁷

The Reagan Administration has accepted the recommendations of those who advocate an expansion of America's CW capability.

Late in 1981, a divided Congress approved \$20 million to install production equipment for the new nerve gas agents at the Pine Bluff, Arkansas arsenal. Current plans to initiate the production of binary weapons and upgrade existing offensive and defensive capabilities will require significant budget increases.⁸ These increases have drawn strong criticism from those who question the need for an enhanced CW capability and those who propose, in these days of increasing scrutiny of the defense budget, that defense funds be spent on other weapons and systems.

The battle is joined and the dust has not settled. Let us examine some of the central issues from the points of view of the CW advocates and critics in an attempt to see our way through the haze to a realistic and prudent CW posture.

THE CASE FOR CHEMICAL WEAPONS

Whether or not gas will be employed in future wars is a matter of conjecture, but the effect is so deadly to the unprepared that we can never afford to neglect the question.

General Pershing

Annual Report to the Congress, 1919

General Pershing's admonition to Congress in 1919 occurred long before the development of the supertoxic nerve gases such as Tabun, Sarin, Soman, and VX which now constitute the bulk of the superpowers' chemical arsenals. Nevertheless, such a warning is still appropriate today and coincides with the most compelling argument made by contemporary Western advocates for chemical weapons.

In general, analysts advocating chemical weapons rearmament argue that (1) the Soviet/Warsaw Pact CW capability is much larger, more effective, and at a higher state of readiness than its US/NATO counterpart; (2) most of the factors that traditionally have discouraged the use of chemical weapons are absent from Soviet considerations; (3) the potency and flexibility of the Soviet CW arsenal would give decided advantages to the Warsaw Pact in both conventional and tactical nuclear war with NATO; (4) the essentially passive CW defensive posture of NATO is neither sufficient for the protection of our troops, nor does it constitute an adequate deterrent; and (5) the rather modest price tag associated

with chemical modernization and enhanced preparedness relative to the improvement in deterrence and the protection they will provide to NATO troops make improved CW capabilities cost-effective and prudent. Let us consider these arguments in turn.

East-West Chemical Warfare Arsenals Compared.* Most succinctly stated, the offensive chemical forces of the Soviet Union/Warsaw Pact are reputed by some to exceed those of the United States by *two to three orders of magnitude*.¹⁰ In an overview entered into the *Congressional Record* for September 16, 1980, it was noted that the

Soviet Union outnumbered the United States 35 to 1 in chemical units, 14 to 1 in production facilities, and outnumbered [the US] also in chemical personnel, decontamination equipment, chemical munitions, and ground-based delivery systems.¹¹

There is, however, little agreement within the defense community on the exact size and nature of the Soviet Union's CW arsenal and production.¹² Estimates of the Soviet chemical arsenal range from 20,000 to as much as 700,000 agent tons¹³ and that 5 to 30 percent (the latter figure is probably closer to reality) of the massive conventional ammunition stockpile of the Soviet Union consists of chemical munitions.¹⁴ Nevertheless, even the lower range of the estimates of the Soviets' CW arsenal suggests a potent capability.

According to unclassified sources, Soviet chemical troops constitute a separate combat arm of the military forces. The peacetime strength of the CW troops is estimated to be from 50,000 to 100,000 men with a sizable surge reserve available for crises.¹⁵ These troops, classified as "specialists," undergo extensive preparation and training under battlefield conditions with live agents. Chemical units are located throughout the Soviet armed forces to provide CBR (Chemical-Biological-Radiological) defense down to regimental and company levels.¹⁶ These troops operate a host of automatic warning units and decontamination units (vehicles, steam units, boilers), provide reconnaissance operations, and are trained in the treatment of battlefield CW casualties.

John Erickson, an authority on Soviet military affairs, argues that:

There is abundant and incontrovertible evidence that the Soviet high command has now fully integrated chemical warfare into the structure, training, and equipment of all branches of the Soviet armed forces, including ground, air, and naval elements.¹⁷

To proponents, this assertion seems valid since: (a) CW is one of the most lethal means of destroying an enemy and a highly effective means of incapacitating him under combat conditions; (b) Soviet artillery units are normally provided CW shells;¹⁸ (c) chemical munitions are considered weapons to be routinely available;¹⁹ (d) Soviet tanks and personnel carriers are equipped with overpressure ventilation systems that would facilitate operations in a chemical environment; (e) chemical munitions would be an important means of neutralizing an enemy's nuclear installations; and (f) Soviet military doctrine insists that only the mass use of any weapon can be decisive.²⁰ Moreover, the Soviets apparently maintain multiple options for delivering chemical weapons including 122mm, 130mm and 152mm guns, multiple rocket launchers, free rockets (FROG), guided missiles (SCUD), land mines, aircraft fragmentation bombs, aircraft spray tanks, and possibly cruise missiles.²¹

Juxtaposed against this awesome capability are the "very limited chemical warfare capabilities" of the NATO alliance.²² While the *minimum* estimate of the Soviet chemical arsenal is 20,000 agent tons, the total US retaliatory capability is identified between 30,000 and 40,000 agent tons: 20,000 tons of nerve agents manufactured between 1953 and 1967 and 10,000 to 20,000 tons of mustard agent²³ in munitions or in bulk form.²⁴

However, even the 40,000-ton estimate of the US chemical arsenal is misleading for several reasons. In the first place, mustard gas freezes at 57°F which means that much of NATO's retaliatory CW arsenal might present operational problems if war were to break out during late fall or winter.²⁵ Second, much of our chemical stockpile may not be in projectiles.²⁶ Therefore, the chemical agents available in bulk form probably would not be ready for use in the event of hostilities. Consequently, the state of the 20,000 tons of nerve agents takes on crucial importance. This brings us to a third problem which detracts from the credibility of the US CW deterrent: approximately 5,000 of the estimated 30-40,000 agent tons have been decommissioned in the demilitarization of obsolete munitions.²⁷ Finally, it is probable that some quantities of nerve agents in our 15-30-year-old arsenals are no longer reliable, raising the ugly prospect that some NATO crews may be victims of their own chemical munitions.²⁸ When one considers the collective effects of these problems, it is possible that the entire operational US CW arsenal consists of less than 10,000-12,000 agent tons in increasingly obsolete munitions.²⁹

Perhaps even more disturbing is the fact that only a small percent of our total CW arsenal is deployed.³⁰ The bulk of these munitions would permit only limited NATO CW retaliatory operations,³¹ assuming that the stockpiles were not destroyed by Soviet preemptive strikes. To respond in kind to the Soviets' purported ability to conduct month-long CW operations 500km into enemy territory³² would require the movement of massive quantities of chemical munitions from the United States. This situation would pose numerous problems for American and European military planners. First, CW munitions would be one among many important items that would have to compete for scarce cargo space in a time of crisis. Space taken up by CW munitions would replace other critical war materiel needed in Europe. Second, if hostilities had commenced, it is not certain that CW munitions would get through at all or in time.³³ Finally, major legal and logistical obstacles would have to be overcome to get CW munitions to troops in battle, especially if the battle is fast moving and mobile as anticipated by the AirLand battle concept under consideration by Pentagon planners.³⁴ In other words, speed and wide dispersion of tactical forces, both operational virtues relied upon by NATO tacticians, pose logistical nightmares for the employment of CW by NATO.

According to proponents, additional problems bedevil US and NATO CW planners. The Western Alliance has neither the numbers of weapons and personnel nor the extensive training of its eastern adversaries.³⁵ Indicative of the asymmetry that exists across a broad range of capabilities is the West's decontamination capability at the division level which is, *at best*, 25 percent of that of the Soviets. Above the division level, the US decontamination capability is virtually nonexistent.³⁶

Another serious problem concerns the readiness of Western forces to operate in a CW environment. Distribution of protective equipment and the training to use it effectively have been spotty, leading General Jones to comment that:

Current overall protective capability [of US forces] must still be rated as marginal to limited, primarily because of insufficient supplies of protective clothing, protective shelters, decontaminating equipment, and the lack of adequate forward area warning systems.³⁷

The disturbing preponderance of the Soviets' CW capability becomes even more ominous in light of General Jones' warning that "their offensive and defensive chemical operations beyond a level required for deterrence leads one to suspect that the Soviets plan to use their CW stocks primarily in an offensive posture."

The Absence of Constraints to Soviet Use of CW. Some analysts concede that the Soviets have a significant CW capability but take strong exception to the view that they will use their chemical weapon in an offensive mode. They cite, for instance, that during World War II, Nazi Germany refrained from using chemical weapons despite its overwhelming qualitative lead over its adversaries in this area.³⁹ Nazi CW restraint during World War II is particularly important because its overwhelming lead is comparable to that of the Soviet Union today. Also, there are few illusions about the willingness of the Nazi leadership to employ barbarous measures against their fellow man. If the Nazis had the means and were not restrained by moral scruples, why did they not employ their significant CW capability? More importantly, is it possible that the same restraints that prevented the Germans from taking advantage of their unique position also apply to the Soviet Union today? Let us examine the restraints that prevented German use of CW.

In the first place, Adolph Hitler had political and personal motives for not using chemical weapons. As a soldier in 1918, he suffered considerably as a wounded survivor of a British mustard gas attack.

I, too, was seized with pain which grew worse with every quarter hour and at seven in the morning I stumbled and tottered back with burning eyes . . . my eyes had turned into glowing coals. it had grown dark around me.⁴⁰

Most likely this experience influenced his judgment in later years. Furthermore, Hitler had to be concerned with domestic and world opinion. His concealment of the nature and extent of the "Final Solution" demonstrated his concessions to both. Hitler, the consummate propagandist, was likely to place considerable stock in the revulsion and propaganda reverses that would accompany the use of chemical agents.

A second restraint upon the Germans, which affected Hitler and certainly became real toward the end of the war as the Luftwaffe lost control of German air space, was the fear of retaliation.

German intelligence had grossly overestimated the Allies' CW capability and the fear which Albert Speer expressed in 1943 summarized German attitudes at the time:

... all sensible army people turned gas warfare down as being utterly insane, since, in view of America's superiority in the air, it would not be long before it would bring down the most terrible catastrophe upon German cities "1

A third restraint was German unpreparedness, in spite of their possession of nerve agents. The super-efficient lethality of the nerve agents led German political and military planners to anticipate the use of the weapon against population centers and to underestimate its tactical applications.⁴² As a result of their countervalue views, the Germans packaged a large proportion of their chemical agents in bombs rather than in the artillery shells or spray tanks which were preferable for tactical deployment.⁴³ Not only were the Germans unable to employ sizable tactical chemical stocks, they were unable to deliver what munitions they had as the Luftwaffe lost control of the German air space and concentrated on the production of fighters to defend the homeland rather than bombers for offensive operations.

Finally, the German Officer Corps maintained an antipathy toward CW in spite of the fact that it was first to employ it during World War I.

The German General Staff and the German general officers, with few exceptions, were not interested in chemical warfare. The lack of interest was not based on a lack of faith or on disbelief of its promises of success; the reason was simply that ... chemical warfare was not understood, nor did the majority of German generals try to understand it.⁴⁴

In addition to this antipathy and aversion, German general officers were concerned particularly about "logistical strain," "unpredictability," and "extra coordination between units." In summary, then, it might be said that the Germans lacked the means, the understanding, the appropriate stocks, and the dedication to employ what might have been a most formidable weapon.

Proponents of improving NATO's CW capability, however, see no similar restraints functioning today on Soviet leadership. As noted above, proponents assert that Soviet military forces have sufficient quantity of agents, types of munitions, and trained

manpower. The Soviet military has emphasized CW in its writings on military doctrine. More importantly, the limited ability of the West to respond in kind to Soviet CW use (given the inadequacy of NATO's CW stocks and CW training, political dissention on CW, and doctrine which, unlike the Soviets', fails to address comprehensively the integrated use of conventional, chemical, and nuclear munitions) may moderate the Pact's fear of a NATO CW response, while presenting perceived opportunities and advantages which could undermine deterrence.

Incentives for the Soviet Use of CW. Apart from the absence of serious restraints upon Soviet use of CW against Europe, proponents contend that there are numerous incentives for its use. First, chemical weapons are capable of providing great tactical flexibility which would contribute significantly to the achievement of quick success upon the battlefield before the West's economic and technical superiority could be brought into play. Peter Vigor describes the quick success scenario as one of the three "war winning" factors, any one of which, should it become operative, could persuade the normally cautious Soviets to abandon their pessimistic view of confrontation with the West and entice them into launching an attack."

Chemical weapons could afford the Soviet military planner great flexibility in a number of operational scenarios and situations. Certain chemical agents, such as hydrogen cyanide (Agent AC), lend themselves to achieving successful tactical breakthroughs which require speed, surprise, and shock. Agent AC, which attacks oxygen in the blood, is fast acting (it is effective in less than 30 seconds); it is difficult to detect by mechanical means in the early stages (the element of surprise); and it would generate many casualties within a short period of time (the element of shock). Furthermore, it dissipates in 7 to 10 minutes after the attack. Advancing troops could launch their attack against adversaries unable to respond in kind and unsure of when the next CW round would be fired. Therefore, the defenders (unlike the attackers) would be required to don cumbersome protective suits."

Area denial is another quick success scenario that would invite the use of chemical agents. Highly persistent blister agents, such as mustard, cause casualties when the vapors are inhaled or when the liquid comes in contact with the skin." Its oily consistency allows it to cling to protective clothing and equipment, thereby making

imperative time-consuming decontamination of men and machines passing through the area. Area denial may range from several days to several weeks depending upon weather conditions, the type of agent(s) employed, and the concentration of the attack.⁴⁴ Successful area denial would reduce the mobility of the enemy and channel its movement through areas well-prepared by the Soviets as killing zones. Such Warsaw Pact capabilities would hinder NATO's ability to resupply troops in the field and to reinforce besieged positions, thereby undermining the integrity of NATO's forward defense strategy.

Other agents such as thickened Soman (GD) which combine high toxicity, persistence, rapid effectiveness, and incapacitation would be well-suited for the interdiction of Western air and command, control, and communication (C³) facilities.⁴⁵ In short, the contribution of chemical munitions to surprise, shock, and speed in these as well as other scenarios makes them very expedient weapons.

A second incentive that would encourage the Soviets to use CW is their specificity. Chemical munitions only attack living organisms. Therefore, collateral damage to equipment and installations is negligible. If the Soviets were to attack Western Europe, undoubtedly they would wish to preserve as much of its existing infrastructure as possible for postwar reconstruction. Chemical weapons would serve this end.

A third set of incentives focuses on the ability of chemical munitions to reduce the efficiency of enemy forces. Operation in a CW environment requires respirators and heavy protective equipment. Even troops fortunate enough to don their protective equipment in time (disregarding problems arising from defective equipment and inadequate training) face numerous physical and psychological problems that degrade their efficiency by as much as 50 percent.⁴⁶ For instance, the protective gloves issued to US forces result in a loss of tactile sense and suffer a loss of protective capability when they come in contact with petroleum products such as diesel fuel. Any loss of manual dexterity would severely degrade the efficiency of those assigned C³, maintenance, refueling, targeting, and similar operations. Furthermore, Soviet employment of chemical agents would necessitate the reassignment of significant numbers of Western personnel to purely defensive tasks such as chemical reconnaissance, decontamination, and casualty

handling. Western training and capabilities for such operations are marginal. This is especially true for civilians responsible for logistic support in the rear areas.

A final incentive that would encourage the Soviets to use their CW capability in a conflict with NATO would be the stakes at hand. If war between East and West were to break out, the Soviets would be fighting for the survival of socialism, as well as the survival of their political system and empire.³¹ The outcome of such a conflict would be all important and one can only expect that the Soviets would pursue victory with every means at their disposal. Not to use their chemical munitions would be to forfeit a substantial advantage. It is unlikely that the Soviets would exhibit much restraint in such a cataclysmic conflict. The following statement by Marshal V. D. Sokolovsky, one of the Soviet's most influential military strategists, supports this contention.

A war must be conducted decisively, using the necessary forces and means to achieve political and military goals. The need for success is incompatible with the requirements for limiting the scale of combat operations.³²

Additional support for this Soviet view is provided by V. Ye Savkin:

The degree of influence of new means of warfare on methods of conducting combat operations is directly related to the number and quality of those means. New forms of weapons and military technology employed in small numbers cannot have a substantial influence on the character of combat operations.³³

In sum, it can be said that Soviet use of chemical weapons would degrade the West's combat capability seriously, and further contribute to the already adverse balance of conventional power in Europe. The benefits that might accrue to the Soviets from their use of CW without the threat of a NATO significant retaliation in kind has prompted many Western planners to prescribe the rapid revitalization of NATO's chemical arsenal in addition to a commitment to "accelerate antichemical warfare measures."³⁴

Deterrence and the Shortcomings of a Passive Defense. The advocates of CW rearmament point out that NATO's capability to wage CW is so miniscule relative to the CW capability of the Warsaw Pact that the Western Alliance would be left without an adequate response to Pact employment of this effective weapon

short of a nuclear response. Is the threat of such a response credible to the Soviets and their allies?

The credibility of a NATO nuclear response to a successful Soviet attack with chemical weapons is predicated upon numerous complex and uncertain considerations. It will depend upon the allies having the political will and the technical abilities to deliver nuclear weapons. Furthermore, there must be consistency between the severity of the threat and the response evoked for the latter to be viewed as credible.

According to proponents, a persuasive case can be made that these considerations diminish the credibility of the US/NATO protective nuclear umbrella. In the first place, some evidence supports the contention that the United States—as well as its NATO allies—lack the will to employ such weapons. In the late 1950's, Charles de Gaulle maintained that the United States would not risk the existence of New York or Washington to save Paris or Bonn from a Soviet onslaught. More recently, former Secretary of State Henry Kissinger stunned NATO members when he noted:

it is absurd to base the strategy of the West on the threat of mutual suicide. [NATO should not rely too strongly on] strategic assurances that [America] cannot possibly mean, or if we do mean, we shouldn't want to execute, because if we do execute then we risk the destruction of our civilization."⁵⁵

Comments such as these—as well as the increasing frequency of calls by influential Americans to (a) adopt a no-first-use policy governing NATO nuclear weapons,⁵⁶ (b) withdraw some US troops from Europe,⁵⁷ (c) adopt a maritime strategy,⁵⁸ and (d) rely increasingly on a light and highly mobile rapid deployment force—do little to reassure the European allies that the United States views its national security as coincident with that of Western Europe.⁵⁹

Undoubtedly, the Europeans believed that the Soviet Union was deterred from attacking conventionally when the US theater nuclear arsenal was superior. However, the credibility that NATO's theater nuclear arsenal would be employed against a Soviet conventional attack is mitigated by a number of factors: the achievement, according to numerous Reagan Administration analysts, of Soviet theater nuclear superiority;⁶⁰ the expectation that the Soviets, who ridicule as unrealistic Western limited warfighting scenarios, would respond massively against Europe and the United States to any first use of nuclear weapons;⁶¹ and the

West Europeans' well-publicized hesitancy to bet their survival upon the deployment of additional nuclear weapons whose deployment many view as counterproductive to peace and stability.

Even if one assumes away the substantial technological and political⁶² obstacles standing in the way of efficacious employment of theater weapons, the credibility of the threat to use these weapons is rendered uncertain by possible problematic relationships between the Soviet threat and the NATO nuclear response. In light of the massive and incomprehensible destruction that would be visited upon both sides in a conflict which escalated to nuclear conflagration, are the Soviets likely to find credible the threat of a NATO nuclear response as an automatic consequence of their tactical use of *limited* quantities of mustard or nerve gas? A NATO nuclear response, totally out of proportion to the severity of the threat, may be characterized as *mismatched deterrence*. In his widely acclaimed *Strategy of Conflict*, Schelling illustrated such a condition:

Automatic destruction for small misdemeanors, like expensive incarceration for overtime parking, would be superfluous but not exorbitant *unless the threatened person considered it too awful to be real and ignored it.* (Emphasis added)⁶³

Clearly, the credibility of NATO's theater deterrent would be strained severely under certain limited CW scenarios, especially in light of the Soviet Union's impressive and growing nuclear capabilities. The proponents of CW modernization argue that NATO must be able to respond swiftly and decisively to a Soviet CW attack *in kind* since the threat of an escalation to nuclear war is not credible. Hence, they argue, NATO's current posture is insufficient and, ultimately, dangerously destabilizing.

The Costs of CW Modernization. Relative to certain conventional and strategic programs with price tags running into the scores of billions of dollars, the proponents of CW modernization and expansion note that the costs involved are quite modest. The production of chemical agents offers few technical or financial obstacles to a country with the political will and even meager funds. The production of phosgene, mustard, and hydrogen cyanide is easily within the capability of most underdeveloped countries, hence the reference to chemical weapons as the "poor man's atom bomb." After World War II, the Soviets

took advantage of captured German scientists, the low production expenses, and the potential lethality of nerve agents to produce a sizable chemical stockpile to provide a counterbalance to the US atomic monopoly.

Even the production of the more sophisticated nerve agents holds few technical obstacles inasmuch as their chemical properties are extensively described in the open literature.⁶⁴ A 1974 development and production estimate for 155mm and 8-inch binary projectiles (with these binary weapons as the most expensive of all chemical systems) was \$191 million: \$23 million for R&D, \$10 million for the production base, \$117 million for 155mm procurement, and \$40 million for 8-inch procurement.⁶⁵ Adjusting these figures for inflation still does not put CW production beyond the means of the scores of countries with defense budgets running into the billions of dollars.⁶⁶ Chemical rearmament advocates note that, given the flexibility and lethality of chemical weapons, an investment of \$7-14 billion during this decade is prudent and wise. Funds spent for an offensive capability will provide credibility to NATO's deterrent posture, and monies spent for defensive capabilities will increase the likelihood of survival for US and West European forces should war occur.

Furthermore, the demonstration of American resolve by opting for chemical rearmament might benefit chemical arms control negotiations with the Soviets which have been pursued vigorously since 1977, but with disappointingly little success. Apart from problems of verification which have hindered arms control success, it has been argued that the Soviets have no incentive to negotiate away their potent arsenal in the absence of an equal American capability. Just as the Soviets have argued that the United States did not become seriously interested in strategic arms control until the Soviet Union attained strategic parity, it can be argued now that the West cannot hope seriously to interest the Soviets in chemical weapons arms control until we improve our CW arsenal. If, by taking steps now to reduce the asymmetry between the Soviet and US chemical forces, we increase the chance for arms control in the future, then our policies are wise indeed.⁶⁷

The actual and projected US expenditures for chemical weapons and programs which appear below demonstrate the Reagan Administration's resolve to strengthen the country's CW capabilities.⁶⁸

<i>Year</i>	<i>Expenditure (in \$ Millions)</i>	<i>Percent Increase</i>
1978	111	
1979	123	9.8
1980	157	21.7
1981	262	40.0
1982	455	42.4
1983	810	43.8
1984	1400	42.1

The United States has committed or is planning to commit these funds to a number of ambitious projects over the next 5 years. These projects include:⁷⁰

- Plans to produce two chemical binary weapons: the 155mm GB projectile and the BIGEYE VX bomb. "Consideration of other systems, to include more effective agents and longer range delivery systems, are currently under review."

- The reestablishment of the Army Chemical School at Fort McClellan, Alabama. This school will provide training, including detoxification training with live agents.

- The activation of a Nuclear, Biological, Chemical (NBC) Company in each division, separate brigade, and corps, in addition to placing an NBC qualified noncommissioned officer in every company and a lieutenant and noncommissioned officer in every combat arms battalion.

- In the Army, the 7,400 chemical personnel will increase to 11,200 by the end of FY 87 with a target strength of over 21,000.

- The Marine Corps is creating NBC defense units at Marine Division, Marine Aircraft Wing, and Force Service Support Group levels.

- NBC warrant officers will be assigned throughout the Marine Corps structure down to the regimental level.

- The Air Force will increase its force structure by placing 800 chemical defense specialists at bases in the high threat areas in FY 83 and FY 84. A total of 707 additional life support technicians will be placed to maintain aircrew protective equipment.

- Over 630,000 unserviceable, unrepairable munitions have been identified for immediate demilitarization. An R&D program (\$13 million) is planned for FY 83 to continue development of safe,

efficient, and cost-effective technology to replace the current energy intensive and costly methods of disposal.

As might be expected, the breadth and scope of such ambitious CW plans have generated significant criticism from numerous military and civilian national security analysts. Their arguments touch on elements as diverse as Soviet intentions, the reliability and validity of national intelligence estimates, the nature of deterrence, ethics, and intra-alliance politics. Proponents, however, absolutely are convinced that modernization and increased US offensive capability is necessary.

THE CASE AGAINST CHEMICAL WEAPONS.

One suspects that the opponents of an ambitious US chemical weapons modernization program are motivated by a profound moral aversion to an inhumane instrument designed to destroy human life. Producing and contemplating the use of poison gas clashes with convictions that the United States has a noble purpose that would be tainted and somehow diminished by association with so odious a means of killing. However, it has been argued by some that killing with chemical munitions is not any worse than killing with nuclear weapons. Yet, NATO is willing to deploy the latter, but not the former. Therefore, there must be a difference between the two which does not rely solely upon moral arguments. This difference, and the heart of the case against chemical weapons, focuses on six policy considerations: (1) a lack of unambiguous evidence regarding the quantities of chemical agents the Soviets produce, where they store them, and where they are deployed; we cannot be sure whether the primary Soviet CW effort is offensive or defensive; (2) while the politically significant aversion to CW in Western democracies, often underestimated by Western CW proponents, has no visible counterpart in the Soviet Union, practical inhibitions to Soviet CW use against NATO do exist; (3) the West has enough chemical munitions, and NATO defensive measures—combined with maintaining existing stocks and non-CW military capabilities—are sufficient to deter Soviet CW use; (4) even if used first by the WP, a large-scale NATO response in kind would have only marginal military effects; (5) assets planned for the binary weapons program would be better invested in other Western military systems; and (6) political costs outweigh the

military advantages of a vigorous US chemical weapons modernization effort.

Interpretation of the Threat: The Hard Evidence. CW advocates typically cast the Soviet CW threat in words like these:

The USSR represents the most serious threat to the United States and its allies. The Soviets' massive CW defensive preparation, extensive training and awesome offensive delivery capability leave little doubt as to their capability to conduct CW operations. The WP forces are better equipped, structured, and trained than any other in the world for fighting in a chemical environment. Moreover, their capabilities continue to improve and the CW disparity between the WP and NATO countries continues to increase. It is apparent that the Soviets are prepared for the possibility that chemicals would be used in a European conflict.⁷¹

According to CW opponents, to make an offensive threat of this carefully worded statement requires the linking of extensive Soviet CW defensive preparations, which can be proved, to the "awesome offensive delivery capability," which raises more questions than it answers.

Certainly, opponents argue, both the United States and the USSR are *capable* of delivering conventional, chemical, and nuclear weapons anywhere in the world. The Soviets could point to US artillery, missiles, and aircraft and rightfully assert that we are *capable* of using them to deliver lethal chemical agents. Further, reference to continuing Soviet CW improvements can be applied across-the-board to Soviet efforts to catch and pass the United States in virtually all military areas.⁷² Our renewed interest in CW, it is argued, whether measured in defensive terms, official Army Field Manuals (such as FM 3-10) which instruct on target selection and attack procedures (with tables to determine the number of chemical weapons that need to be fired into a target area to obtain the desired level and types of casualties), or by plans to build the Pine Bluff binary production facility, allows the Soviets to see us as we see them. In the statement cited above: we are improving our offensive and defensive CW capabilities, and we have a limited but deployed delivery capability. Hence, in all likelihood, the Soviets see us as a threat. This is hardly surprising, considering the profound suspicion each of the superpowers exhibits toward the other. Consequently, Soviet and American strategic planners view each other's moves with the presumption of hostile and sinister intent, despite the claims of each that CW preparation is designed for deterrence, defense, and retaliation to the other side's first use.

Worst case planning results, with each side subscribing to what it sees as the exigencies of prudence. In such situations, planners may overestimate their adversary's capabilities and underestimate their own. Speculation and circumstantial evidence are viewed too often as hard intelligence. Those who question the validity and reliability of the data on Soviet capability are seen as naive and, therefore, to be heeded only at the risk of national unpreparedness. They are told that there can be no compromise with the devil whose language is duplicity and currency is force.⁷³

However, according to opponents, the theoretical capability to do something does not necessarily indicate a willingness to do it. This raises the issue of intent, consideration of which leads to assumptions regarding Soviet willingness to engage in first use of CW in violation of treaties to which the USSR is signatory.⁷⁴ Opponents of the binary modernization program seek evidence of Soviet capability and indicators that the Soviet Union is willing to take the risks inherent in using CW against a superpower.

Substantial evidence suggests that the Soviet Union is concerned deeply with defending its soldiers against the effects of chemical warfare. Opponents concede that the Soviets have protective masks and suits, many of their fighting vehicles are secure from the effects of chemical agents, and they have gone to great effort and expense to field decontamination equipment. We also know that Soviet troops are trained to operate on a CW battlefield and that chemical units are found at every level of the Soviet armed forces.⁷⁵ Thus, according to opponents, the issue is not Soviet concern for CW, but rather whether their concern is for defense or offense. That isn't easy to sort out.

Soviet doctrine is not particularly helpful in this connection. While one can interpret Soviet doctrine as being compatible with the offensive use of CW,⁷⁶ no clear statement of Soviet intent to use CW in a "conventional" attack can be found. A case could be made by selectively citing Soviet literature to show that CW fits nicely into Soviet offensive doctrine. But the case remains circumstantial and speculative in the absence of evidence, giving rise to numerous and often contradictory interpretations. Thus, opponents of increased NATO CW capabilities contend that Soviet defensive preparations may be just that: defensive. They believe that this view is quite plausible since, in World War I, the Russian armies suffered more than 60 percent of the total fatalities and 35 percent of the casualties produced by CW.⁷⁷

World War I Chemical Warfare Casualties/Fatalities

<i>Country</i>	<i>Fatalities (000)</i>	<i>Casualties (000)</i>
United States	1.5	73
Russia	56	475
Italy	4.6	60
Austria-Hungary	3	100
Britain	8.1	189
France	8	190
Germany	9	200
TOTAL	90.2	1,284

To allay Soviet concerns, opponents contend, it is not enough for us to say that the President—or even a treaty—rejects first use of chemical agents by the United States.⁷⁸ The Soviets are no more inclined to trust us than we are to trust them. Thus, General Pershing's admonition, cited earlier, remains valid today: prudent planners in all armies—including the United States and Soviet armies—are well-advised to protect their soldiers against the possible use of lethal chemical agents.

Opponents contend that the United States has made great efforts to connect alleged use of lethal BW or CW agents in Afghanistan, Laos, and Kampuchea to the USSR, but thus far much of the world remains unconvinced. However, they note that attempts to find the smoking gun in the hand of the Soviet Union have not been crowned with success despite a mass of circumstantial evidence suggesting that someone has been using CW in these Third World countries.⁷⁹ Reports of CW use are frequent, and a sample from Southeast Asia has been produced. The reaction around the world has been decidedly unenthusiastic, although fewer remain unconvinced. One suspects that the world chooses to view charges and countercharges by the superpowers as manifestations of their competition, a propaganda war in which each attempts to demonize the other. There seems to be just enough evidence to allow proponents and debunkers to maintain their positions. The US Government tacitly admitted as much when it circulated a thick compilation of news stories and reports in the UN suggesting Soviet CW use in Afghanistan, Laos, and Kampuchea.⁸⁰ The following disclaimer appears on page 2 of the document:

This document responds to requests made by other governments, international organizations and individuals for a collection of reports of the use of chemical weapons in Afghanistan, Laos, and Kampuchea which have come to the attention of the US Department of State. This information is from multiple sources and therefore reflects varying degrees of knowledge of the events. This document also contains denials that these weapons have been used. Much of the text is based upon verbatim testimony. The reports for each country are in chronological order—from earliest to most recent.

The cover sheet carried only the title and no date appeared. The document was provided to UN delegations before debate on alleged CW use, but it was not formally entered as evidence. This is not the way a government normally presents its brief to an international forum when hard evidence is available. The document insinuates and alleges, but it does not prove. Presumably the US Government recognized that the document was less than conclusive proof and behaved as it did to raise the issue without investing prestige in a weak case. Reasonable doubt seems to characterize the attitudes of the nations of the world as they observe what probably appears to many to be yet still another propaganda battle between the Soviet Union and the United States. We seem to expect that benefit of the doubt should work to our advantage, but the moral ascendancy the United States once enjoyed no longer can be assumed. Increasingly, the world views both the United States and the USSR as powerful and potentially dangerous troublemakers lacking restraint. The November 1981 "Report of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons," directed by the UN General Assembly, was inconclusive. The group of experts "found itself unable to reach a final conclusion as to whether or not chemical warfare agents had been used"¹ because their access to the region was constrained.

Thus, opponents contend US efforts based on circumstantial evidence may be counterproductive. They note that the Soviets are quite capable of turning US allegations to Soviet advantage by charging the United States with waging a campaign to smear the USSR in order to cover the US decision to go ahead with a large CW effort. One needn't be an inspired propagandist to point out that, while US charges of Soviet CW use in Afghanistan and Southeast Asia are unproved, US efforts to fund a CW production facility in Pine Bluff are real.

Aside from the propaganda aspect of alleged Soviet CW use in the Third World, important as that may be, opponents contend

that the question of what even proven use there would mean to war in Europe remains. It is one thing to use CW against poorly armed tribesmen in remote areas and another to use CW against foes equipped with a chemical retaliatory capability and nuclear weapons. Mussolini used CW in Ethiopia, but not against the British and Americans who assaulted his homeland. The Japanese made limited use of CW against the Chinese, but not against the Americans, even when the Japanese faced imminent defeat in 1945. The fact is that, since World War I, CW use has been restricted to use against victims who not only lacked the capability to respond in kind but against those incapable of effectively responding in any significant manner. Such is not the case as the Soviets contemplate CW use against the United States and NATO. It is not clear that in kind retaliation is the only or the best deterrent of a foe capable of using chemical weapons.

In the years after World War II when the United States enjoyed first a nuclear monopoly and later unquestioned nuclear superiority, the Soviets may well have emphasized CW as the poor man's weapon of mass destruction. The Soviets are notoriously loathe to discard old weapons systems.¹² It may be that their CW stocks consist largely of munitions similar to those US stocks that proponents of CW modernization consider old and deteriorating. Since such matters are closely guarded secrets, it is exceedingly difficult to collect hard intelligence, but to convince opponents of CW modernization and to mobilize allies, proponents of CW modernization must:

- Produce evidence that the Soviets stock chemical munitions. It is certainly difficult to do so, but plausible information regarding amounts and locations of Soviet CW stocks would help the proponents' case.
- Produce more than circumstantial evidence that Soviet doctrine includes plans to incorporate CW routinely.
- Produce more than general statements of Soviet capability and still photographs of Soviet soldiers in protective suits if allegations of Soviet offensive first use of CW are to be credible.

Raising the question of evidence irritates the proponents of CW. They complain that the evidence demanded of them regarding Soviet production and storage of chemical agents isn't demanded of those who assert that the Soviets have menacing capabilities in their conventional and nuclear forces. While it is true that

unambiguous evidence of Soviet CW production, storage, and deployment has not been produced, Western intelligence agencies have been far more successful in accounting for Soviet tanks, artillery, manpower, and nuclear weapons. CW advocates are frustrated by the fact that it is almost impossible to determine the amount of chemical agents the Soviets produce and the locations of their stockpiles. Clearly these are well-guarded secrets. National technical means of detection cannot produce answers.³³ At best, they produce data that fit into a larger mosaic which requires interpretation. Skeptics of the alleged Soviet superiority in CW are all too well aware that the fictitious bomber, missile, and ABM gaps that frightened American security analysts periodically since World War II were the results of circumstantial evidence filtered through the prism of worst case analysis.

In sum, opponents of CW argue that the Soviet CW threat is exaggerated, in part to justify US modernization plans, and continue to press for evidence that as of yet is apparently unavailable. They maintain that attempts by the US Government to lay charges of CW use in Afghanistan, Laos, and Kampuchea at Moscow's feet haven't gotten the reaction hoped for either at home or abroad and are irrelevant to the CW debate in Europe.

Constraints. Quite aside from producing evidence proving the precise nature of the Soviet CW threat, opponents argue that tactical, technical, and strategic constraints deserve the attention of those who advocate US CW initiatives. The general repugnance of chemical agents pushed the CW issue to philosophical discourse and political debate. Without denigrating the ethical and moral aversion to CW—inherently important and policy relevant in the popular democracies of NATO—and without underestimating the resistance and fears of ordinary Americans and Europeans to the very idea of using chemical weapons, opponents contend that the constraints often are overlooked in what is clearly an emotionally charged subject.

Meteorological conditions, civilian population density and human fallibility play a much greater role in the effective use of chemical agents than they do in the use of most conventional weapons. Gordon Burck notes that the effects of chemical weapons depend on wind speed and direction, atmospheric stability, humidity, temperature gradients, sunlight, and the type of terrain. If there is little vertical air movement, the lethal cloud from an

intense attack could drift as much as 60 miles, affecting friendly as well as hostile troops."

Opponents note that the accident in the vicinity of Dugway Proving Ground in March 1968 illustrates the possibility of a human catastrophe when invisible gas is used even under carefully controlled conditions by experts. Some 6,400 sheep died in a 200-square mile area at an average distance of 27-30 miles from the intended target during a test. Whatever the exact cause, equipment failure or human error, the accident has a chilling effect as one considers what might have happened had the incident occurred in densely populated Europe instead of in sparsely populated Utah. One observer noted: ". . . two hundred square miles of West Germany may be expected to contain *about 128,395* citizens" Even if lethal agents are transported and stored in relatively safe binary munitions, their use as a weapon after they have been combined into a lethal agent cannot rule out human error or equipment failure. Since the United States hasn't used CW in anger since 1918, no claim to great experience in their employment can be made. One needn't be a pacifist to express grave concern for the safety of civilians and troops who might be victims of their own side's use of CW. East and West Europeans who live where the NATO-WP battles are likely to be fought can be expected to be more dubious than the superpowers about chemical storage in peacetime and use in war.

Opponents argue that uncertainties and constraints abound on both sides. Among the inhibitions to Soviet enthusiasm for CW are: the deficiency of particularly cumbersome Soviet protective suits which quickly exhaust soldiers wearing them;" fear in Eastern Europe and in the Soviet Union that Soviet CW use might result in terrible retribution by NATO, whatever form such retribution might take; increased Soviet dependence upon Central Asian Muslims and Transcaucasian infantrymen, many of whom do not speak Russian well, are poorly trained to operate efficiently in a CW environment, and generally are regarded as less than enthusiastic Soviet soldiers;" and the terrible losses in both World War I and II inflicted upon Russians by Western armies, largely the consequence of historic Western technological superiority." These considerations suggest that the Soviets may not be eager to promote CW, and their concerns may be more defensive than offensive.

The West, opponents contend, suffers from many similar constraints. Moreover, they argue the political relevance of moral

and emotional aversion among Europeans and Americans, concern for accelerating a CW arms race, further damage to US claims of moral ascendancy *vis-a-vis* the Soviet Union, additional strains to the NATO Alliance which is already burdened with internal disputes, and various logistic problems associated with CW combine to suggest that it might be unwise to venture beyond the CW capabilities we already possess. Most opponents of increases in NATO offensive capability, however, recognize that these restraints do not suggest any less need for prudent defensive measures.

Both sides would find CW proliferation dangerous, and both must consider the probability that use of CW would take a higher toll among unprotected civilians than among trained and protected soldiers. Neither side welcomes the logistical burden, the security precautions required, or the risk that terrorists and third countries could complicate superpower calculations by emulating the superpower CW efforts."

Deterrence. Any Soviet consideration of the exclusive use of chemical agents against NATO must take nuclear response, current US chemical capabilities, and some very deadly conventional weapons into account. While it is true that nuclear response by NATO to Soviet CW use would cause much soul-searching in Western capitals, there is no way for the Soviets to know what the outcome would be. Chemical warfare opponents contend that it would be out of character for the normally cautious Soviets to initiate CW use in the hope that NATO's response would not be nuclear. Prudent Soviet planners are not likely to take that chance. The momentous decision to risk Armageddon would probably dictate initial use of all the means at the Soviets' disposal—conventional, chemical, and nuclear—to take maximum advantage of shock and bring the war to its most rapid conclusion. In such a case, a Western CW response would be of marginal value, if not irrelevant, whether based upon current capabilities or on a modern binary system.

Keeping the possibility of cataclysmic nuclear war uppermost in the minds of Soviet planners is the strategic preference in Europe, as well as among those in the United States who oppose further expansion of US/NATO CW capabilities, since it links US nuclear retaliation to possible defeat of NATO's conventional forces, irrespective of how that defeat may occur. That is, the Soviet

planner must take very seriously the need to smash US troops in any Soviet offensive in Western Europe. US troop presence makes that necessary, and it is for Soviet leadership to contemplate the possible consequences of a major blow to the US forces in Europe. The fundamental element of deterrence in Europe is the link between what the Soviets might be able to do—charge to the Channel—and the consequent question posed: what then? The starkness of the proposition is what appeals to European strategists, because the Soviets cannot be certain of the US response. According to opponents, the introduction of what generally is seen as an intermediate level of war (chemical warfare is generally regarded as more than conventional and less than nuclear) undermines this application of the theory of deterrence because it lengthens and makes less automatic the leap from conventional to nuclear war and, therefore, contemplates superpower war limited to European soil. In other words, it suggests to all Europeans that war might be limited to that theater. Furthermore, it suggests to West Europeans that the US nuclear umbrella might be uncoupled from the defense of NATO, amounting to a radical revision of the alliance's strategy. Through the eyes of the Europeans, this weakens the alliance, undermines deterrence, and ultimately endangers their very existence.

Often overlooked, opponents further argue, in the doomsaying that makes a Soviet charge to the English Channel a simple technical task⁹⁰ is how that act would affect Soviet security as it is seen from Moscow. To get to the Channel, the Red Army would need to defeat hundreds of thousands of American citizens and soldiers who would be killed, wounded, interned, or simply stranded in Europe. Under such dangerous and unpredictable circumstances, could the normally conservative Soviet decisionmakers be certain that the Soviet Union would be more secure on the Channel than at the Elbe? Even if the Soviets were to control West European territory, they would confront a number of serious problems. The English and French SLBM forces, invulnerable to the Soviets' antisubmarine warfare capability, would be capable of dreadful retaliation even if the United States and the People's Republic of China were not to become involved. However, the USSR could hardly count upon such a passive response from its eastern neighbor or its principal adversary. Even rapid Soviet "success" in Western Europe would leave both the

PRC and the US homelands unscathed, hostile, and capable of terrible counterblows. Further, it is one thing to conquer and another to control, as recent events in Poland and Afghanistan demonstrate. Control of all of Europe and exploitation to Soviet advantage are no simple tasks. Finally, opponents of increased NATO CW capabilities argue that potentially lethal risk-taking by the Soviets makes little sense when patient and consistent political pressure, applied in the context of US-West European differences on numerous issues such as the pipeline and INF deployment, seems safer and equally effective. It makes little sense for the Soviets to climb out on slender branches when it may be merely a matter of time for the breezes of Western dissent to shake the fruit from the tree. In brief, the usefulness of war itself is questionable as a means of pursuing a particular policy. The role of Soviet military power is to deter the West from attempting to reverse by force what they see as the inevitable flow of history.' It makes no sense to risk the gains of two-thirds of a century on a single cosmic roll of the dice, especially if the dice were loaded with a CW capability which might well kill more European civilians than NATO soldiers.

Thus, opponents argue, Soviet use of CW in a nonnuclear war is theoretically possible, but unlikely, because it would reserve for the West the all-important decision of choosing the time and place for the first use of nuclear weapons. In the event of a Soviet nibble or testing of the water in, for example, Berlin or Spitzbergen, the use of CW by the Soviets would seem to be provocative out of all proportion to the test—the purpose of which, presumably, would be to demonstrate a lack of coherent and determined NATO response. Should NATO's response be firm and decisive, the Soviets—one must suppose—would like to allow a means to back off, an option possibly precluded by the use of CW. It might appear that Soviet use of CW means that they have accepted the risk of a NATO nuclear response. If the Soviet CW attack is limited, we have enough for a limited CW response. Massive Soviet use of CW clearly risks a NATO nuclear response, especially if Soviet planners believe that NATO lacks a massive CW retaliatory capability. It is difficult to imagine the combination of circumstances that would justify such high risk-taking by the Soviets. In brief, according to opponents, NATO's nuclear power deters massive Soviet CW use, and NATO's CW capability is

sufficient to answer limited Soviet CW probes.²² In unlimited war in Europe, NATO's CW capability quickly becomes irrelevant.²³

Some Military Problems of CW. The military advantages to the West of a modern CW retaliatory capability are not the only issues affecting modernization plans. Western possession of numerous chemical weapons might deter the Pact from resorting to CW by threatening retaliation in kind. Furthermore, NATO use of chemical munitions would certainly threaten to degrade Pact operation performance by obliging its soldiers to fight in cumbersome protective suits. Finally, the production of a massive chemical arsenal by the West would demonstrate resolve in peace and determination if used in war.

In spite of the plausibility of these contentions, numerous military arguments against increased Western reliance upon chemical munitions hinge upon the fact that most Army officers are unenthusiastic about CW. Major General Frederic J. Brown, Deputy Chief of Staff for Training, US Army Training and Doctrine Command, in *Chemical Warfare, A Study in Restraints*, makes a telling point when he says that CW was never assimilated by the US Army.²⁴ Soldiers understandably feel more comfortable with familiar weapons and tried concepts than with the new, especially when the consequences could be both unpredictable and catastrophic. This uncertainty is not difficult to understand. Artillery officers would prefer to carry basic loads of munitions which *would* be used in combat rather than munitions that *might* be used. Quartermaster, Ordnance, and Transportation Corps officers would not welcome the transportation, storage, and security problems associated with lethal gas, even in a binary form. Aviators are not enthusiastic about delivering poison gas, particularly the delivery of invisible and odorless substances by spray tank. Logisticians are concerned that the sheer bulk of chemical munitions might reduce their capability to insure the continuous flow of nonchemical weapons and equipment from North America to Europe in time of need.²⁵ Planners, on the purely technical level, must ask how proficient staff officers are to plan, target, and conduct CW operations, a somewhat arcane and neglected art in which error could be serious indeed. In brief, a renaissance of interest in CW in the US forces would constitute far more than the introduction of a new weapons system. It may not be an exaggeration to call it a revolution affecting everyone in

uniform, from the Army's Chief of Staff to the private in the foxhole. This explains why it has been so long since the US Army has given anything more than lip service to CW.

A second major problem confronting CW advocates concerns stationing. If Europe won't store additional stocks of chemical munitions, and that is probable as we shall see below, chemical stocks would presumably be maintained in the United States for deployment in time of tension or war. There is no way to forecast whether shipment of chemical weapons to Europe in time of crisis will heighten or reduce the crisis. Furthermore, no one has indicated what might be displaced by chemical agents, as both sea and airlift, already strained to the breaking point, would require the specification of clear priorities among troops, weapons, munitions, fuel, equipment, and chemical agents. Getting large quantities of CW to possible users in time of war will be very difficult, even if all but one cannister per munition is deployed at the outbreak of hostilities. Matthew Meselson, the Harvard biochemist who has been following the chemical warfare issue for 20 years, "calculates that to bring 5,000 tons would require the full-time services of 2,000 C141-B transport planes (of which the United States has 234) and 3,000 semitrailer trucks for 12 days."''

Given present moods in Europe, getting Europeans to station larger CW stockpiles in Europe in peacetime is unlikely. Senator Gary Hart (D-Colorado) cautions that asking NATO allies to accept deployment of binary weapons, in addition to the weapons already on hand, "would only create an intense and divisive debate on the issue and endanger the deployment in Europe of our existing stocks."'' The obvious question becomes: if we can't store chemical munitions where we want them in peace and can't transport them there in war, why produce them? It has been suggested that the binary weapons might be more acceptable to the Germans and other Europeans because they are safer to handle than older unitary CW stocks, but it is uncertain to CW opponents that these arguments will be decisive. While some German officers on the NATO military staff may agree with the assessments concerning the safety and potential use of chemical weapons, members of the Social Democratic Party—the party of former Chancellor Helmut Schmidt—have insisted that the party press for the removal of existing CW stocks currently stored in the Federal Republic." It is unclear whether this initiative is another

manifestation of the antinuclear mood in the FRG or a direct reaction to announced US plans to build a plant for the production of binary chemical weapons. It is doubtful that any FRG government would welcome a US push for additional chemical weapons while it is still trying to muster support in Europe for the deployment of the Pershing II and cruise missiles.

Despite the laudatory claims made by the proponents of binary weapons, opponents cite an additional reason to approach them cautiously. The military effectiveness of the binary weapons has been challenged because they haven't been field-tested. Major General Niles J. Fulwyler, Director of the Nuclear and Chemical Directorate, Department of the Army, said in an interview with *The New York Times*: "... we do not need live testing because we can do all the necessary testing in a laboratory environment with modern technology."⁹⁹ On the other hand, Saul Horvats, a former executive in the development laboratories at Edgewood Arsenal, who was in charge of developing, testing, and producing the weapons now stocked, is less optimistic. He anticipates a failure rate of 20-30 percent in artillery rounds and 50 percent in the BIGEYE bombs if only simulant and computer tests are performed. Furthermore, due to the vagaries of the mixing process, binary rounds may not be as efficient as unitary loads. In contrast, he says that less than 1 percent of existing weapons, which wouldn't experience mixing problems, would fail.¹⁰⁰ Senator Hart and Professor Meselson also lament the lack of field-testing.¹⁰¹ The General was probably taking political realities into account and making virtue of necessity. Since we can't field-test, we'll have to accept laboratory testing.

Irrespective of the hypothesized superiority of binary munitions, the choice of weapons to deliver them provides little or no military advantage. The first production priority at Pine Bluffs is chemical agent fill for 155mm artillery rounds.¹⁰² The characteristics of the gun mean that the binary munitions will be fired at the same range as the old (unitary) 155mm CW round. They will not reach out to Soviet second echelon targets. Assuming that they would be fired from positions in the FRG, they would land 16-24km from where fired—in the FRG. The bombs planned for later production could be delivered against deeper targets, but manned aircraft sorties would be much in demand for the delivery of other munitions in either close air support or interdiction missions. As in the case of

strategic mobility, hard decisions need to be made regarding priorities for limited delivery assets.¹⁰³ Missile or rocket delivery of CW is still in the concept phase. Priorities for binary production as of 1982 remain 155mm munitions and bombs to be delivered by manned aircraft.

Cost. Opponents argue that CW modernization will divert funds from other military requirements and is likely to stimulate interservice rivalry. The cost estimates for the administration's modernization plans vary from \$7 to \$14 billion in the decade of the 1980's.¹⁰⁴ By Department of Defense spending standards, these costs are neither prohibitive nor the most serious obstacle to binary production. Those amounts, however, would purchase a lot of strategic lift, conventional artillery, tanks, reserve stocks of munitions, precision-guided missiles, additional quality manpower, or any number of other items on the DOD shopping list. Presumably, the Navy and the Air Force could recommend some interesting ways to spend an extra \$7 to \$14 billion. As the Congress demonstrated in its postponement of the Administration's CW initiatives, the proponents of CW will find it more difficult to compete with those seeking increasingly scarce funds for the equipment noted above, all of which are *certain* to be needed during a war. Requests for unprecedented levels of funding in support of CW will result in fierce budget battles between bureaucratic leviathans.

The Political Dimension. According to CW opponents, the really tough nut for chemical warfare proponents is the political resistance to US CW initiatives. Psychological and moral aversion to CW is the background to specific objections. Calling such opponents emotional and naive doesn't make them go away. Thus, despite the merits of refutations of specific objections to CW, the fact is that the Western World simply doesn't like the stuff. Of course, neither does the West (nor the East for that matter) like nuclear weapons. Herein lies the peculiar nature of the debate that often confounds CW proponents who make military arguments to support their case. They may wonder, if dead is dead, what difference does it make whether the means of dispatch are nuclear or chemical? In fact, it might even be argued that, inasmuch as chemical weapons do not destroy property, they are less destructive than nuclear weapons and present fewer obstacles to the postwar efforts of survivors to resume their lives. The problem is that, with

the exception of two isolated incidents in far away places, nuclear weapons have not been used and nobody in Europe has experienced their terror. The threat of being atomized is almost surreal and beyond comprehension. On the other hand, the very mention of chemical warfare evokes memories in many Europeans of terrible personal experiences that resulted from the use of these odious weapons. It elicits the imagery of Remarque's *All Quiet on the Western Front*: trenches, writhing flesh in agony, low-hanging, noxious clouds, and the very lunacy of wasting hundreds of thousands of lives for temporary possession of a few square kilometers of barren land. The point is that opposition to CW will not be overcome by military logic or political exhortation. The proponents of CW are bedeviled by the proposition that an ounce of image is worth much more than a pound of substance.

The general aversion to lethal chemicals has been a constant since World War I, and the grass roots demand for a nuclear freeze in Europe and the United States promises a similar response as the publics on both continents become aware of US plans for renewed attention to another weapon of mass destruction. An administration already depicted by its critics as inclined to confrontation is certain to be cast in the villain's role as the CW story unfolds. The United States continues to see itself as the hero wearing the white hat, but the world has clearer memories of our involvement in Indochina and the Watergate affair than of Wilson's Fourteen Points, the Marshall Plan, and the Berlin airlift. To many non-Americans, the land of the free and the home of the brave is just another self-seeker in a world bereft of nobility. Thus, opponents contend, our advocacy of CW will do nothing to enhance our self-image as the chosen people.¹⁰⁵

CW response in kind has a certain *sui generis* appeal to those who find comfort in symmetry and believe that deterrence is based upon a rigid system for system equality rather than on an overall parity of forces.¹⁰⁶ There is a danger, however, that exclusive reliance upon a technical solution to a military problem might demonstrate a convincing internal logic that fails to take into account crucial but indeterminate external factors that might result in political costs out of all proportion to those military gains. Strong CW initiatives taken by the United States violate Clausewitz' most basic assertion regarding military purpose. Moreover, these initiatives are likely to do serious harm to the Alliance which is already seriously strained.

It is distasteful and often incomprehensible for Americans concerned with national security to understand that our friends might see us, rather than the Soviet Union, as the disturbers of the peace. The unrelenting growth of the Soviet military has been so consistent that this growth is regarded as a constant in political life, something akin to fog in London. On the other hand, US efforts have been so inconsistent that periodic American efforts to redress a military imbalance which favors the Soviets appear bellicose and frightening to our allies. Western European fears, heightened when American military efforts are coupled with confrontational rhetoric, were illustrated recently by the German parliamentarian who said: "... the Poles want their superpower to stop telling them how to live and we want ours to stop telling us how to die."¹⁰⁷ This can be seen as a lament marking the death of detente, a death attributed by some more to Washington than to Moscow. There is no reason to believe that US chemical warfare initiatives will be seen differently. They will appear to be further evidence of the US preference for confrontation, while Europe prefers detente.¹⁰⁸

As is the case with intermediate nuclear forces (INF), Europe remains to be persuaded that CW is good for it. Recent evidence of European aversion to chemical weapons was provided by the governments of Norway and Holland which stated they would not allow the deployment of such weapons on their territory. Moreover, the stated policy of the FRG is not to allow the training of its troops in the use of chemicals "now or in the future."¹⁰⁹ Even if a convincing CW threat can be established, Europe can be expected to continue to resist both stationing in time of peace and use in time of war—for good political reasons.¹¹⁰

NATO's defensive strategy virtually insures that combat in the Central Region, should it occur, will be conducted in the Federal Republic of Germany. Soviet attacks into the FRG would be unable to bypass population centers thereby placing Western leaders in the untenable position of knowing that their tactical use of chemicals would kill more friendly civilians than enemy soldiers, a serious inhibition to NATO use of CW on European territory. Hence, opponents suggest that we recognize the political circumstances confronting the leaders of our democratic allies. Political exigencies are more urgent and tangible than military contingencies which are perceived as unlikely to occur. We cannot divorce military hardware and strategy from their political purposes lest we

violate Clausewitz' most elementary dictum regarding their inseparability and thus risk undermining the integrity of NATO.

The current mood in Europe can be characterized in a word: unsettled. The popular reaction to both INF and the enhanced radiation warhead (neutron bomb) suggests that a Europe accused of being neutralist, pacifist, and anti-American will be unenthusiastic should we attempt to impose improved lethal chemical weapons on our allies. Such pressure could undermine US attempts to persuade the Europeans to increase their military budgets and proceed on schedule with the deployment of the Pershing II and ground-launched cruise missiles. There is reason to believe that the already strained relations between the United States and NATO Europe might be stretched to the breaking point by such pressure. Stationing additional chemical munitions in Europe, in whatever form, is simply not in the cards for the foreseeable future.

Nor does the problem reside wholly with the Europeans. Those who would convince Western Europe of the need to modernize and deploy chemical weapons shouldn't take American willingness to do so for granted. The wave of grass roots resistance to nuclear armaments in the United States seems to be an echo of what had been described earlier as European "neutralism, pacifism, and anti-Americanism." The movement to "freeze" the levels of weapons of mass destruction is strong on both sides of the Atlantic. Obviously, "anti-Americanism" does not apply on this side of the Atlantic, and it probably isn't a very accurate description of what is happening on the other side. A general feeling of unease is manifest in the West, and it cannot be ascribed wholly to European leftists or American campus radicals. Church organizations, former defense officials, citizens of Western and Eastern Europe and American small towns assemble to express concern for what they fear is a superpower nuclear race to the precipice. The climate is not congenial for initiatives which frighten Americans, our allies, and our adversaries. The production of new or additional chemical weapons has met resistance in the United States and the deployment of such weapons will not be supported by our allies.

CONCLUSIONS AND RECOMMENDATIONS

So what does all this mean?

We have presented the arguments for and against a US chemical weapons modernization program. The essence of the proponents' case for the binary system can be summed up as "better safe than sorry." The case against an ambitious US effort to produce binary weapons essentially considers what we know about US and Soviet CW capabilities and concludes that the existing US capability is adequate when seen in the context of overall US and Soviet military capabilities;^{1 2} the marginal CW improvement of our security posture is not worth political costs.

There is merit in the arguments of both sides. The evidence discussed in this essay leads one to the following conclusions.

- The Soviets and the Warsaw Pact have a potent CW force, although precise estimates of the nature and extent of the threat are unattainable.

- In spite of Soviet CW strength, uncertainties (due to weather, terrain, etc.) attending the use of chemical agents, as well as the scope and severity of a NATO response, make an assured and rapid victory far from certain for the Soviets and may therefore deter their employment of chemical agents more than is commonly acknowledged.

- The size and potential lethality of the US/NATO chemical arsenal may be understated. The West's chemical arsenal is probably adequate to deter the Soviet use of chemical weapons in any limited conflict scenario. Soviet chemical munition quantitative advantages notwithstanding [because of (a) the degradation of performance due to deficiencies of Soviet protective gear, (b) the collapse of morale and paralysis of will which would accompany a successful NATO counterstrike with chemical weapons, (c) the difficulty of exercising command and control in a chemical environment (all of which pose serious obstacles to the Soviets' quick victory doctrine and goals,¹³ and (d) the fact that the Soviets could not be sure that an unsuccessful NATO limited CW response might not hasten the use of nuclear weapons¹⁴].

- In an all-out offensive employing nuclear and chemical munitions, it is unclear that the West would accrue any significant advantages by pursuing a massive chemical munitions buildup.

The policymaker is confronted with the difficult task of reconciling conflicting claims to truth and wisdom and devising a policy that is militarily prudent, yet mindful of the political exigencies inherent in a multilateral alliance such as NATO. Our analysis of available evidence leads us to the following

recommendations which might be useful to those who make decisions affecting the security of the United States and Western Europe.

- The search for a military equalizer should not be allowed to blur the national interest, nor should it so focus on a single tree that we forget we are deep in a forest. Risking the continued existence of NATO for a marginal increase in military capability is like buying new tires for an automobile whose engine and transmission may burn out if they are driven much further. Thus far, we have sought to play the CW tune in a relatively low key, because we do not want to jeopardize the fragile INF dual decision. However the INF issue works itself out, there is no indication that Western Europe is prepared to welcome additional chemical weapons on the continent. Another acrimonious debate between Europe and the United States would do further damage to NATO as the Soviet Union is fully prepared and able to exploit transatlantic differences. We should not attempt to force our allies to do things they will not do. Many do not want to store or use additional chemical weapons.

- The inclination of some US defense analysts to stare fixedly at Soviet capabilities tends to result in efforts to match them in kind, an inclination that too often causes us to study a single part while forgetting the integrated whole. In other words, overemphasizing the chemical balance may cause us to underestimate the impact of weapons such as PGM's and fragmentation cluster bombs which are highly efficient means of thwarting an attack by armor and infantry in a CW environment. The criterion against which contemplated policy must be measured is, ultimately, what deters war. Prudent military measures designed for fighting wars must be fitted into the higher priority of what prevents wars. Paradoxically, military measures to make marginal improvements to warfighting ability can do harm to deterrence should the military measures undermine alliance cohesion. Deterrence is, in fact, an amalgam of military capability and political will. Both are necessary. Military capability must be seen in its entirety as it appears to the adversary. The task for the United States is to elicit cautious behavior by the Soviets without frightening our allies. Emphasis on a single component of our broad military capability, particularly one unacceptable to allies, is not in the West's best interests.

- Improving NATO's defensive CW posture is imperative. Therefore, training, distribution of protective equipment and

research should continue.¹¹⁵ Protecting our soldiers against chemical weapons makes good sense to even the most passionate opponent of CW. It gives a clear signal of concern and places the adversary in the villain's role, which is precisely where we want him. Further, by reducing the efficiency of Soviet chemical weapons against military targets, it becomes clear that civilians are the likely victims of Soviet CW use. The conquest of territory inhabited by the survivors of CW is unlikely to win their hearts and minds, thus deterring Soviet use on the basis of both limited efficiency against NATO forces and alienation of a population presumably to be governed by the Soviets in the postwar period.

- A two-part declaratory policy by the United States is needed. It should state that: (1) use of "weapons of mass destruction" against NATO will find a NATO response using "weapons of mass destruction at the appropriate level," and (2) NATO regards chemical, biological, and nuclear weapons as weapons of mass destruction. This declaratory policy links the US nuclear weapons to Europe without inviting the political debate that would accompany US proposals to alter CW policy significantly, and it is sufficiently ambiguous to increase the problems and risks for Soviet planners as they consider possible CW use. Chris Donnelly, a noted analyst of Soviet military policy, supports this option when he notes:

If the Soviets believe that their initial and widespread use of lethal chemical agents during a conventional phase might induce NATO to retaliate with nuclear weapons, or might substantially bring forward in time a NATO decision to permit nuclear release, it is certain that, in Russian eyes, this would render the use of chemical weapons completely counterproductive.¹¹⁶

- A low key upgrading of the US chemical arsenal, on a unilateral basis and without drawing Europe into a debate, is desirable. Pending the resolution of technical deficiencies and consultation with our NATO allies, the one-for-one *replacement* of existing US military stocks with binary weapons is recommended to (1) keep our hand in the state of the art, (2) address the safety concerns of the Europeans while not asking them to accept additional CW munitions, and (3) improve the readiness and effectiveness of our CW arsenal. The objective of the retaliatory component of the US program is to maintain the smallest, safest stockpile that denies a significant military advantage to any initiator of chemical warfare. We need not, and should not, plan to

match the Soviets in agent/munition quantities and types. Further, our allies have been informed that no decisions have been made regarding deployment of chemical weapons. Should it ever be determined that overseas deployment is desirable, there must be full consultation with the allies involved prior to making any decision. This seems a prudent route and follows our low key approach.¹¹⁷

- However, the delivery means should not be conventional artillery, as is now planned. The reason for ruling out conventional artillery is basic: chemical munitions fired from artillery tubes almost certainly land on friendly territory because of the limited range of the delivery system. Even if this territory is occupied by Warsaw Pact forces, the prospect still frightens our European allies. Furthermore, the logistical problems associated with CW munitions make it unlikely that they would arrive on the battlefield due to competing demands for transportation of people and equipment that would certainly be used in combat. Long-range delivery means circumvent doctrinal problems of use, psychological and political problems of storage in Europe, and logistical problems associated with getting chemical munitions to where they might be required. Aerial spray tanks allow for rapid movement and employment for admittedly limited strikes designed more as evidence of political will than military effectiveness. The point here is to give a political signal to Moscow *in extremis* without alarming European NATO in time of peace. Long-range delivery insures that the victims, if CW is ever used, would not be friendly civilians.¹¹⁸

- Some improvement of CW capabilities by the United States is probably necessary if the Soviets are to be expected to negotiate reductions of their capability—whatever it is. Negotiations to eliminate or reduce CW capabilities on both sides are absolutely necessary even if a successful outcome is in doubt due to such intractable problems such as verification. Our allies expect us to make that effort, and failure to do so would assist the Soviets in dividing NATO. Maintaining and rehabilitating existing stocks of CW, while continuing research in laboratories with a goal of replacing rather than augmenting existing stocks, is less provocative and more in the spirit of arms control than the creation of a massive CW arsenal with limited military utility and enormous political costs.

ENDNOTES

1. See McGeorge Bundy, George Kennan, Robert McNamara and Gerald Smith, "Nuclear Weapons and the Atlantic Alliance," *Foreign Affairs*, Spring 1982, pp. 753-768.

2. Henry Gole, "Through European Eyes," *Parameters*, December 1981, pp. 14-23.

3. S. M. Shaffer, "West European Public Opinion on Key Security Issues, 1981-1982," Washington: International Communications Agency, Office of Research (European Branch), June 1982.

4. See Robert W. Komer, "Maritime Strategy vs Coalition Defense," *Foreign Affairs*, Summer 1982, pp. 1124-1144.

5. P. Graveley, "Defense or Deterrence? The Case for Chemical Weapons," *RUSI Journal*, December 1981, pp. 13-20; Association of the United States Army (AUSA) Special Report, "A Chink in Our Arms—The Urgent Need for Chemical Weapons," Arlington: no date; C. J. Dick, "Soviet Chemical Warfare Capabilities," *International Defense Review*, January 1981, pp. 31-38; John Erickson, "The Soviet Union's Growing Arsenal of Chemical Warfare," *Strategic Review*, Fall 1979, pp. 63-71; Senator John Tower (R-Texas), "The Politics of Chemical Deterrence," *The Washington Quarterly*, Spring 1982, pp. 25-37; Major Ian P. Bambini, Jr., "Chemical Warfare and the NATO Alliance," *Military Review*, April 1981, pp. 28-33. Also, see note 38.

6. R. L. Wagner and T. S. Gold, "Why We Can't Avoid Developing Chemical Weapons," *Defense* 82, Arlington: American Forces Information Services, July 1982, pp. 3-11, C. J. Dick.

7. For instance, see M. Meselman, "A Biochemist's Case Against the New Nerve Gas," *Christian Science Monitor*, May 17, 1982; Senator Gary Hart (D-Colorado), Letter to the Editor, *The Wall Street Journal*, February 4, 1982, p. 31; G. Burck, "Old Fears, New Weapons: Brewing a Chemical Arms Race," *The Defense Monitor*, Vol. IX, No. 9, Washington: Center for Defense Information, 1980, pp. 1-8; and J. P. Perry Robinson, "Chemical Warfare Capabilities of the Warsaw and North Atlantic Treaty Organizations: An Overview from Open Sources," in *Chemical Weapons: Destruction and Conversion* by Stockholm International Peace Research Institute, London: Taylor and Francis, Ltd., 1980, pp. 9-56.

8. Wagner and Gold. Also Tower (p. 31) notes.

The most controversial element of the President's request [for chemical rearmament] is likely to be the roughly \$50 billion for procurement of long-lead items needed to produce 155mm binary artillery shells and BIGEYE aircraft-deliverable bombs.

9. The comparisons and figures cited in this paper exclude the chemical warfare stockpiles and capabilities of France. For a discussion of France's "not negligible" CW capability and doctrine, see Dick, January 1981, p. 35; Robinson, pp. 28, 39; and J. Pergent, "Services des Poudres," *Forces Aeriennes Francaises*, 24, 1970, pp. 89-102.

10. A. Hoeber and J. Douglas, "The Neglected Threat of Chemical Warfare," *International Security*, Summer 1978, pp. 55-82.

11. Entered into *Congressional Record*, September 16, 1980. Cited in AUSA, p. 17.
12. Robinson, pp. 10-12; Graveley, pp. 13, 17; AUSA, pp. 17, 20; Dick, p. 31; and Tower, p. 3. Robinson notes (p. 10) that the last serving Soviet official who spoke or wrote openly about CW did so in 1938.
13. Tower, pp. 27-28; C. N. Donnelly ("Winning the NBC War: Soviet Army Theory and Practice," *International Defense Review*, August 1981, pp. 989-996) explains the substantial variation in Western estimates of the Soviet CW arsenal (p. 990).

Nor is the difference of opinion over what is chemical, and what is not, confined solely to toxins. The Soviets consider smoke to be a chemical weapon; this fact alone may be enough to account for the wide differences in Western estimates of Soviet stocks of chemical munitions. The Soviets also consider all nonlethal and incendiary agents (e.g., napalm) to be chemical weapons.

14. Dick, p. 36; John Erickson, (p. 65) credits the Soviet Union with giving "as much as 50 percent of all filled munitions for missiles and bombs stockpiled by Warsaw Pact forces in Central Europe." However, John Tower (p. 27) cites US intelligence estimates as correct that "approximately one-third of the Soviet shells, rocket warheads, and bombs are stored in Eastern Europe."

15. Wagner and Gold, p. 6; Dick, p. 32; and Burck, p. 5.

16. John Erickson.

17. *Ibid.*, p. 65; Tower, p. 27.

18. Tower, p. 28; and AUSA, p. 20. Both sources rely upon the sensational, though unsubstantiated, (Oleg) Penkovsky papers which are based upon the revelations of a Soviet intelligence officer who defected to the West almost two decades ago. Also, see Brown.

19. *Ibid.*, Tower, AUSA, and Brown.

20. Dick, pp. 36-37. Also, see endnotes 52 and 53.

21. Wagner and Gold, p. 7; AUSA, pp. 18-19; Dick, pp. 33, 35-36.

22. Cited AUSA, p. 20. Also, see Tower and Erickson.

23. AUSA, p. 20; Burck, p. 3.

24. According to Tower (p. 27), it may take "several years" to load chemical agents in bulk form into projectiles.

25. AUSA, p. 21; Wagner and Gold, p. 6 (these authors note that mustard freezes at 58°F).

26. AUSA, p. 21.

27. *Ibid.*

28. Wagner and Gold, p. 7.

29. AUSA, p. 21.

30. Dick (p. 35) cites 50 percent of the US supply of chemical weapons is in Europe. Robinson (p. 38) puts this figure at a much lower (less than 10 percent) level.

31. In this context, "limited" operations refer to those lasting two weeks or less. See Burton (p. 27) who notes, "Those CW weapons which are deployed in the Federal Republic of Germany . . . would last for about two weeks of widespread operations."

32. Burton, p. 25.
33. Bambini, pp. 31-33. See endnote 90.
34. Bambini (p. 32) cites legal obstacles that inhibit or prevent storage or transit of CW munitions in certain European countries. For instance,

... Norway and Holland have recently stated that they would not allow their forces to use chemical weapons or permit chemical weapons deployment on their territory. The stated policy of the Federal Republic of Germany is not to train its troops in the use of chemicals 'now or in the future.'

Furthermore, Italy has foresworn the right to chemical retaliation.

35. Wagner and Gold, p. 6. For instance, the Soviets provide their troops 100-400 hours per year of formal CW training compared to 16-100 hours for US forces. Furthermore, the Soviets maintain 19 CW training battalions to our one. Also, see Erickson, AUSA, Bambini, Tower, and Donnelly.

36. See AUSA, pp. 17, 22.

37. Cited Graveley, p. 18

38. General David Jones, *Military Posture for FY 1980*, Washington: Joint Chiefs of Staff

39. This question is explored expertly by A. F. Graveley, "Defense or Deterrence? The Case for Chemical Weapons," *RUSI Journal*, December 1981, pp. 13-20. Also see F. J. Brown, *Chemical Warfare—A Study in Restraints*, Princeton: Princeton University Press, 1968

40. Cited *Ibid.*, p. 16.

41. Albert Speer, *Inside the Third Reich*. Cited Graveley, p. 15.

42. J. H. Rothschild, *Tomorrow's Weapons: Chemical and Biological*, New York: McGraw-Hill, 1964.

43. Brown. See also Graveley, p. 15.

44. Rothschild.

45. Peter Vigor, *The Soviet View of War, Peace and Neutrality*, London: Routledge and Kegan Paul, 1975. The other two scenarios (besides the quick victory) which Vigor identifies as independent "preconditions" for a Soviet attack against the West are (1) overwhelming Soviet strategic superiority and (2) political discord within the West so divisive as to allow the Soviets to defeat the various nations one at a time.

46. Graveley, p. 14; Dick, pp. 36-37.

47. Adapted from Dick, *Chemical and Biological Weapons*, p. 230. (See chart on next page.)

48. *Ibid.* (See chart on next page.)

49. Dick, pp. 37-38

50. Wagner and Gold, p. 4. Also, see Dick, pp. 24-35.

51. See A. Ross Johnson, R. Dean and A. Alexiev, "The Armies of the Warsaw Pact Northern Tier," *Survival*, July/August 1981, pp. 174-182.

52. V. D. Sokolovsky, *Soviet Military Strategy* (translated by Harriet Fast Scott, et al.), New York: Crane, Russak & Co., 1975, pp. 68-69.

53. V. Ye. Savkin, *Osnovi Printsipi Operativnogo Iskusstva Taktiki*, Moscow: 1972 (translated by US Air Force as *The Basic Principles of Operational Art and Tactics*, p. 107).

54. Extracted from NATO Communique reported in *The London Daily Telegraph*, May 15, 1980. Cited Graveley, p. 18.

ESTIMATED POTENCIES OF SELECTED CW AGENTS

Agent Aerosolized or Vaporized Over Target

	To Incapacitate		To Kill		
	Respiratory LD-50 ¹ mg-min/m ³	Time to Effect	Respiratory LD-50 ² mg-min/m ³	Percutaneous LD-50 ² mg-min/m ³	Time to Effect
Phosgene (CG) ³	1,600	3-12 hrs	3,200	NA	3-24 hrs
Mustard (HD)	200 ⁴	4-6 hrs	1,500	10,000	4-24 hrs
Hydrogen Cyanide (AC)	NA	NA	5,000	NA	4-15 min
Tabun (GA)	100	1-10 min	400	40,000	10-15 min
Sarin (GB)	55	1-10 min	100	12,000	2-15 min
Soman (GD)	25	1-10 min	70	10,000	1-15 min
Agent VX ⁶	5	1-10 min	36	1,000	4-10 min

¹Dosage estimated to incapacitate half those exposed to it.

²Dosage estimated to kill half those exposed to it.

³As gases, Hydrogen Cyanide and Phosgene only are effective through the respiratory system. They disperse downwind and cannot contaminate ground.

⁴For eye injury.

⁵Sarin vapor disperses so rapidly that, save in very cold conditions, it is not suitable as a ground contaminant; that is, it is effectively nonpersistent.

⁶The performance of agent VX-55 may be roughly similar.

NA = nonapplicable.

PERSISTENCY OF SELECTED LIQUID CW AGENTS^{1, 2}

Agent	Weather Conditions		
	Sunny, Around 20°C, Light Breeze	Wet and Windy, Around 10°C	Calm, Sunny, Lying Snow, Around -10°C
Mustard (HD)	2-7 days	1½ days	2-8 weeks
Tabun (GA)	1-4 days	3 hours	1 day-2 weeks
Sarin (GB)	½-4 hours	½ hour	1-2 days
Soman (GD)	2½-5 days	20 hours	1-6 weeks
Agent VX	3-21 days	6 hours	1-16 weeks

¹The length of time for which contaminated ground/equipment may present a potential contact hazard.

²Single figures are average estimates.

55. Henry Kissinger, "The Future of NATO," *The Washington Quarterly*, Vol. 2, Autumn 1979, pp. 6-7.

56. Bundy, *et al.*; Tower, pp. 36-37.

57. For instance, see Stansfield Turner, "A New Strategy for NATO," *The New York Times Magazine*, December 13, 1981, p. 42, and David Broder, "Rising Isolationism," *The Washington Post*, January 13, 1982, p. 23.

58. Turner; for a thorough discussion of the advantages and disadvantages of the maritime strategy, see Robert W. Komer, "Maritime Strategy vs. Coalition Defense," *Foreign Affairs*, Summer 1982, pp. 1124-1144. Also, see John Weinstein, "US Defense Abroad: Sea Power Is Not Enough," *The New York Times*, July 29, 1982, p. 22.

59 See Kissinger; Gole; Turner; Erik v. Kuehnelt-Leddihn, "Shaky Alliance," *National Review*, March 5, 1982, p. 234; Neil Ulman, "US Army in Europe: 'Warfighting' vs. 'Deterrence,'" *The Wall Street Journal*, April 28, 1982; "Focus on: The Mood of a Nation," published by *The German Information Agency*, April 1982.

60. Wagner and Gold, p. 4; Bundy, *et al.*; Dick, pp. 34-36, Turner, pp. 36-37; Bambini, pp. 28-29

61. Donnelly, p. 990; also, see D. Doder, "Kremlin Defense Official Warns of Policy Shift to Quicken Nuclear Response," *The Wall Street Journal*, July 13, 1982; John Collins, *US-Soviet Military Balance 1960-1980*, New York: McGraw-Hill, 1980, p. 118; and Robert Kennedy, "The Strategic Balance in Transition," in *Soviet Armed Forces Review Annual*, edited by David Jones, Gulf Breeze, Florida: Academic International Press, 1980, pp. 356-357.

62. For instance, see S. Gilbert, "Italy Begins Cruise Missile Base Despite Left's Protest," *The Washington Post*, April 18, 1982, p. A37.

63. Thomas Schelling, *The Strategy of Conflict*, Cambridge, Massachusetts: Harvard University Press, 1960.

64. Beckett, "Chemical Warfare Available to Terrorists," *New Scientist*, October 12, 1978.

65. House Defense Appropriations Subcommittee Hearings, April 25, 1974.

66. As of 1979, 42 countries had defense budgets (in current dollars) in excess of \$1 billion. *Compiled From World Military Expenditures and Arms Transfers, 1970-1979*, Washington: Arms Control and Disarmament Agency, March 1982.

67. For instance, Wagner and Gold (p. 10) cite a \$6-7 billion investment required between FY 1983-87.

68. Bambini, p. 29 and Burton, p. 28. Donnelly (p. 996) argues that the Soviets have incentives to negotiate with us when he states that the Soviets

are becoming aware of their own special vulnerability to any surprise mass use by NATO of toxic chemical agents The Soviets are now coming to perceive a serious danger of NATO actually arming itself with an effective chemical warfare capability. They will take all possible measures to try and (sic) prevent this At the same time, they will strive to improve their own chemical and nuclear delivery and protective systems, just in case.

Also, see Tower, p. 2; Weinberger, III-143.

69. Richard Halloran, "US Plan Reported on New Nerve Gas," *The New York Times*, January 15, 1982. Much of these expenditures are allocated to the demilitarization of obsolete weapons.

70. Casper Weinberger, *Annual Report to Congress, Fiscal Year 1982*, Washington: US Government Printing Office, February 8, 1982.

71. *NATO Chemical Warfare Policy*, Study Brief, Carlisle Barracks: Strategic Studies Institute, August 3, 1981, p. 2.

72. For comprehensive analyses of the shift in the military balance, see: John M. Collins, *US-Soviet Military Balance, Concepts and Capabilities, 1960-1980*, New York: McGraw-Hill, 1980; *Annual Report to the Congress, FY 1983*, Casper W. Weinberger, Secretary of Defense, Washington: US Government Printing Office; Kennedy.

73. For an extensive analysis of the problems in dealing with Soviet intelligence estimates, see John Prados, *The Soviet Estimate*, New York: Dial Press, 1982

74. All members of NATO and the Warsaw Pact, including the Soviets, are parties to the 1925 Geneva Protocol, which outlaws at least the first use of poison gas. See J. P. Perry Robinson, "Chemical Weapons and Europe," *Survival*, January-February 1982, pp. 9-18, for a thoughtful analysis of the significance of renewed US interest in CW.

75. See Caspar W. Weinberger, pp. III-143 to III-148 for a recent restatement of the DOD position and appreciation of Soviet capability in CW.

76. This is usually hedged as follows:

Although available data on the Soviet CW stockpile are limited, *it is assumed* that the stockpile is adequate to meet the combat tasks foreseen by Soviet planners, that production and storage capabilities would not limit the Soviet CW posture, that chemical munitions are sufficient to support sustained, high-intensity chemical conflict, and that the Soviet units are prepared for immediate resort to CW on both an offensive and a defensive basis. (Emphasis added)

Of course, if one assumes all of that, it saves the need for evidence. *Evaluation of Chemical Warfare Alternatives 1980-1990*, Carpenter, *et al.*, Menlo Park, California: Stanford Research Institute, December 1976, p. 5 (a government contract).

77. AUSA, p. 15; Donnelly (p. 996) notes that recently renewed Soviet interest in CW may be the *result* of renewed US interest and initiatives.

78. The US Senate ratified the 1925 Geneva Protocol on December 16, 1974. The President signed it into law on January 22, 1975. *Evaluation of Chemical Warfare Alternatives 1980-1990*, Carpenter, *et al.*, Menlo Park, California: Stanford Research Institute, December 1976, p. 24.

79. "Moscow's Toxin 'Truths'," *The Wall Street Journal*, July 7, 1982, p. 20, begins:

Even though the administration presented compelling evidence last year of the use of deadly toxin warfare agents in Southeast Asia and Afghanistan by the Soviet Union and its allies, there has been some scientific skepticism.

Compelling to whom? This is a suggestion that we haven't digested an important lesson in the past 15 years: we do not enjoy automatic respect any more. The world is as suspicious of us as it is of the Soviet Union. These suspicions are aggravated by exchanges such as the following, cited by Burck, p. 3:

The following comments appeared in a hearing before the House Foreign Affairs Committee on February 8, 1980. Rep. Lagomarsino questioned Dr. Edward M. Collins, Vice Director for Foreign Intelligence in the Defense Intelligence Agency, and Bruce C. Clarke, Director of the National Foreign Assessment Center of the Central Intelligence Agency.

Q: Do we have any information on the use of chemical warfare in Afghanistan other than just rumors?

DIA: There is no confirmation at all that they have used chemical weapons.

Q: . . . the common perception is that the Russians are using it there because there have been a lot of rumors in the papers.

DIA: I don't see anything wrong with letting that rumor run.

It is also interesting to note that the Soviet Union, which views napalm as a chemical weapon, evaluates our use of the substance in Vietnam as evidence of our disposition to use chemical weapons.

The most recent comprehensive and compelling evidence was released November 1982 by the US Department of State. See George P. Shultz, *Chemical Warfare in Southeast Asia and Afghanistan: An Update*, Special Report No. 104, Washington, DC. However, as we see below, willingness to accept the evidence and its impact in the policy arena is limited.

80. *Reports of the Use of Chemical Weapons in Afghanistan, Laos, and Kampuchea*, no date, no credit line. Also see Department of State Special Report No. 98, dated March 22, 1982, "Chemical Weapons in Southeast Asia and Afghanistan."

81. *Report of the Group of Experts to Investigate Reports on the Alleged Use of Chemical Weapons*, General Assembly, United Nations, November 20, 1981, p. 34. The experts consisted of representatives from Egypt, Kenya, the Philippines, and Peru.

82. Tanks illustrate the point. According to *Organization and Equipment of the Soviet Army*, HB 550-2, Fort Leavenworth, Kansas: Threats Office, Combined Arms Combat Development Activity, July 15, 1980, pp. 4-8 and 5-50 through 5-58, the Soviet Army maintains the following medium tanks in its inventory: T-55, T-62, T-64, T-72 and T-80. The T-55 was introduced in 1958, but, in fact, it is a product of continual refinement of the T-54 introduced in 1949. Later models build on previous models in the Soviet system, and old models are retained. So it is with other military equipment; so it may be with CW as is argued by Burton (p. 2). Much of it may be quite old. Also, see Dick, *Chemical and Biological Warfare*, p. 221.

83. The production of lethal agents is exceedingly difficult to detect without on-site inspection. Chemical plans producing harmless substances could hide CW production among other activities. This state of affairs led former Secretary of Defense Harold Brown to testify that "There is no decent estimate" of the Soviet chemical weapons stockpile. (Cited Burton, p. 4.)

84. Burck, p. 3.

85. Based upon a population density of 247 people per square kilometer, the figure published by the Press and Information Office of the Government of the Federal Republic of Germany, the arithmetic comes to 127,946 Germans. But the point is clear: an accident in the FRG like the one in Utah would be a catastrophe. Gene Lyons, "Invisible Wars," *Harper's*, December 1981, p. 40.

86. Major General Niles J. Fuiwylar states that US troops wearing protective suits in tanks had to get out of them in 40 minutes " . . . or risk a health hazard . . . " "Would War With Gas Mean Holocaust?," *The New York Times*, May 2, 1982, p. E5. The Soviet suits are generally regarded as inferior to US protective suits. Burck (p. 4) notes that Soviet protective clothing can be worn only 45 minutes at 70°F in the field and 3 hours at temperatures below 59°F. Also, see Constance Holden, "Binary Nerve Gas Production Plans Debated," *Science*, Vol. 216, April 30, 1982, p. 496; Donnelly, p. 992; Burton, p. 24.

87. Kirill Podrabinek, "An Inside Look at Life in the Soviet Army," *Russia*, No. 3, 1981. Ethnic problems, alcoholism and physical abuse are not unusual in the Soviet Army. The relative decline of European ethnic Great Russians relative to its Muslim population may cause the Soviets to rely more upon their Eastern European allies. To the extent that the non-Soviet Pact members are unenthusiastic about the use of such weapons may reduce the likelihood of their employment.

88. Soviet specialists constantly remind us that since the time of Peter the Great, Russia has felt inferior to the West in technical matters. Despite its many technical achievements, especially in space, the Soviets still turn westward for assistance in building a gas pipeline and for high technology.

89. Some of the moral and political problems attending a renewed US emphasis upon chemical munitions were pointed out by Rep. Clement Zablocki, Chairman of the House Foreign Affairs Committee, on September 10, 1980:

Perhaps most ominous [effect] is the globally destabilizing effect the inclusion of this \$3.15 million program will have for the short term as well as the future. It would be interpreted by the American people and the rest of the world as an abandonment of America's deeply held commitment and efforts to a complete and effective ban on the use in war of lethal chemical weapons, to consider producing them. It would remove another deterrent to the usage of lethal chemical weapons by terrorist groups worldwide. At best, it would make our longstanding foreign policy efforts to ban lethal chemical warfare a sham and at worst a potential human tragedy.

Also, see Rone Tempset, "Nerve Gas: A Stockpile of Secrets," *The Los Angeles Times*, March 10, 1982.

90. For an excellent refutation of the view that a quick conventional victory of the Soviets against NATO is assured, see John Mearsheimer, "Why the Soviets Cannot Win Quickly in Central Europe," *International Security*, Summer 1982, pp. 3-39.

91. See John Weinstein, "Soviet Civil Defense and the US Deterrent," *Parameters*, March 1982, pp. 70-83 (see p. 78); Matthew Meselson, Professor of Biochemistry at Harvard University, calculates that the ratio of civilian to military deaths could be on the order of 20:1 in chemical warfare. *The New York Times*, May 2, 1982, p. E5.

92. Senator Carl Levin, member of the Senate Armed Services Committee, supported the continued credibility of NATO's CW deterrent on September 16, 1980, when he stated:

Contrary to the overly pessimistic description of our present chemical weapons stockpile . . . Secretary of Defense Grown testified to our committee just two weeks ago that these present stocks of chemical munitions still are a "credible" deterrent and they could cause "tremendous" damage if actually used against Soviet troops.

Also, see Robinson, p. 39.

93. Donnelly, pp. 993-996, provides an excellent discussion of Soviet operational problems resulting from a NATO nuclear response.

94. Brown, pp. 293-296. There is no reason to believe that this argument is less valid in 1982.

95. Burck (p. 3) notes:

An attack may catch men who are ill-trained, too surprised to dress in time, or with ineffective equipment, but this cannot be counted on. For average weather conditions in open terrain at a distance of 6 miles, it would require more than 1300 155mm GB shells to cause 30 percent casualties among a prepared platoon. That quantity of shells weighs about 70 tons.

96. Holden, *Science*, p. 497. See note 95. Also, despite Army estimates that it would require 2 million tons of war supplies in the first 60 days of war in Europe, as recently as 1978, Pentagon planners acknowledged that airlift could only deliver 115,000 tons (one mechanized infantry division) in the first 19 days. See W. Flannery, "US Ground Forces: Inappropriate Objectives, Unacceptable Costs," Washington, DC: Center for Defense Information, November 1978.

97. Lois R. Ember, "Senate Votes Funds for Binary Chemical Weapons," *Chemical and Engineering News*, May 31, 1982, p. 27. See also the essence of Senator Hart's views on CW production in his letter in *The Wall Street Journal*, February 4, 1982, p. 31.

98. Ember, p. 29. Julian Perry Robinson, a senior fellow at the science policy research unit of the University of Sussex, England, has studied chemical warfare for over 15 years. He offers no encouragement to those who would expect Western Europe to welcome the storage of CW.

99. *The New York Times*, May 2, 1982, p. 3.

100. Ember, p. 28.

101. *The New York Times*, May 2, 1982, p. 3.

102. Weinberger, p. III-146, and *Military Posture for FY 1982*, David C. Jones, Chairman, JCS, Washington, DC: US Government Printing Office, p. 79.

103. Strategic mobility, by air or sea, is a problem currently being addressed, but it will require consistent support and funding if US worldwide commitments are to be met. The alternative to strategic mobility is forward-basing, a solution accompanied by diplomatic hurdles. See Weinberger, especially pp. III-91 to III-110 for programs addressing the mobility issue.

104. Frank Greve, "Chemical-Weaponry Tab Could be \$14 Billion for Decade," *The Philadelphia Inquirer*, March 7, 1982, p. 6.

105. See note 89.

106. In this vein, it can be argued that precision-guided missiles against tankers and fragmentation cluster bombs (each equivalent to 600 mortar rounds) against troops on foot are more effective killing instruments than chemical munitions.

107. Flora Lewis, *The New York Times*, January 11, 1982, p. A19, citing a remark made by a German deputy during Brezhnev's November 1982 visit to Bonn.

108. In addition to the record of NATO governments on security issues, it is useful to note the public opinions in Europe in the last several years for clues to possible reactions to US chemical warfare initiatives. The CW issue has not been addressed in USICA polls, but responses regarding the superpowers, military balance, the threat, support for NATO, support for INF, and opposition to neutron weapons tells us what might be expected should we press Europe to store modern CW stocks. See "West European Public Opinion on Key Security Issues, 1981-82," prepared by Stephen M. Shaffer, European Branch, Office of Research, International Communications Agency, USA, June 1982. For some explicit negative

European reaction to CW, see *Der Spiegel*, February 22, 1982. The cover story is "Todeswolken uber Europa" (Death Clouds Over Europe), pp 32-52. For a British reaction, see: Paul Aaron, "Many Britons Concerned Over US Chemical Weapons," *Boston Globe*, January 11, 1982, p. 6. Danish and Norwegian refusal to store nuclear weapons on their soil promises a similar response to CW. Increasingly, the Soviets are finding their Eastern allies resistive across a wide range of defense policies. For instance, see John Tagliabue, "4000 East Germans Dispute Official Defense Policy," *The New York Times*, February 15, 1982, p. A3.

109. M. Meselman. Also, see note 114.

110. It is important that one not overestimate the attraction of the safety factor to the European allies. Their opposition to chemical munitions runs deeper than their fear of accidents involving these weapons. Their opposition to these weapons shares certain similarities to their opposition to the Pershing II and cruise missiles: (a) that they are likely to antagonize the Soviets and heighten the arms race; (b) that they allow the United States to plan for a nonnuclear war fought solely on European soil; (c) that they are political liabilities for the party that permits their deployment; (d) that they may result in the uncoupling of the US nuclear umbrella from Europe, etc.

111. On July 22, 1982, the House provided the binary program a setback by voting 251-159 against the retaliatory capability sought by the Administration while approving the funds for defensive measures. Richard Halloran, "The House Rejects Funds to Produce Chemical Weapon," *The New York Times*, July 23, 1982, p. A1.

112. See note 92. Also, despite the argument that America's CW arsenal is dangerously obsolete, there is some evidence that the extent of the problem has been overstated by advocates of binary production in order to support their case. For instance, in a September 1977 Report to Congress (*Stockpile of Lethal Chemical Munitions and Agents—Better Management Needed*, Study LCD-77-205), the Comptroller General of the US General Accounting Office concluded (pp. i-iii):

Department of Defense officials have testified in congressional hearings that the stockpile is deteriorating and that much of it is unserviceable. They said that the stockpile was inadequate in quantity and quality; consequently, they requested funds to prepare to produce a new chemical munition known as a binary.

The true condition of the stockpile is unknown. Its serviceability may have been greatly understated. For example, many of the unserviceable classifications are a result of minor nonfunctional defects, such as container rust, which do not affect usability. Also, inspection samples are neither random nor representative, block storage hampers access during inspection, entire production lots are classified unserviceable for a few defects (Emphasis added.)

Little has been done to maintain the stockpile in a serviceable condition or to restore the unserviceable portions. *Using anticipated approval of the binary program as a reason for not maintaining the stockpile is inconsistent with sound management. Lack of maintenance could seriously compromise US retaliatory capabilities.* (Emphasis added.)

Furthermore, the GAO advised the Army to stop classifying entire production lots as unserviceable because of a few defects when reporting on the stockpile's condition; and stop disposing of usable stocks until stockpile requirements have been defined.

113. See Mearsheimer.

114. Donnelly, pp. 993-996.

115. See Wagner and Gold. The Reagan Administration's CW budget allocates more than 70 percent of projected expenditures to defense purposes

116. Donnelly, p. 996

117. See Warner and Gold, pp. 8, 10.

118. Due to force-to-space ratio constraints, a Soviet advance against NATO positions would necessitate the stacking of Soviet brigades in second and third echelon positions. NATO planners increasingly have looked to means of destroying these reserve forces since their destruction would limit supplies and reinforcements to first echelon troops, thereby taking the steam out of a potential Soviet blitzkrieg (See Mearsheimer.) The long-range delivery of chemical agents against rear echelon troops, C³ installations, rail and other transshipment points, etc., would help to limit Soviet prospects of a quick victory, thereby reducing the likelihood of war in Europe.

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importance of the European allies' sensitivities on the CW issue, the authors recommend continued improvement in NATO's defensive CW stance, a low-key upgrading of the US chemical arsenal followed by the replacement of older munitions deployed in Europe, and a shift in the emphasis of current means of delivery.

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